

THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

CEMENT - SAND AND GRAVEL - CRUSHED STONE - SLAG - LIME - GYPSUM
READY MIXED CONCRETE - CONCRETE PRODUCTS - INDUSTRIAL MINERALS

MAY 1945

Per
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U.S. DEPT. OF
COMMERCE
MAY 22 1945

TO THE AMERICAN PEOPLE:

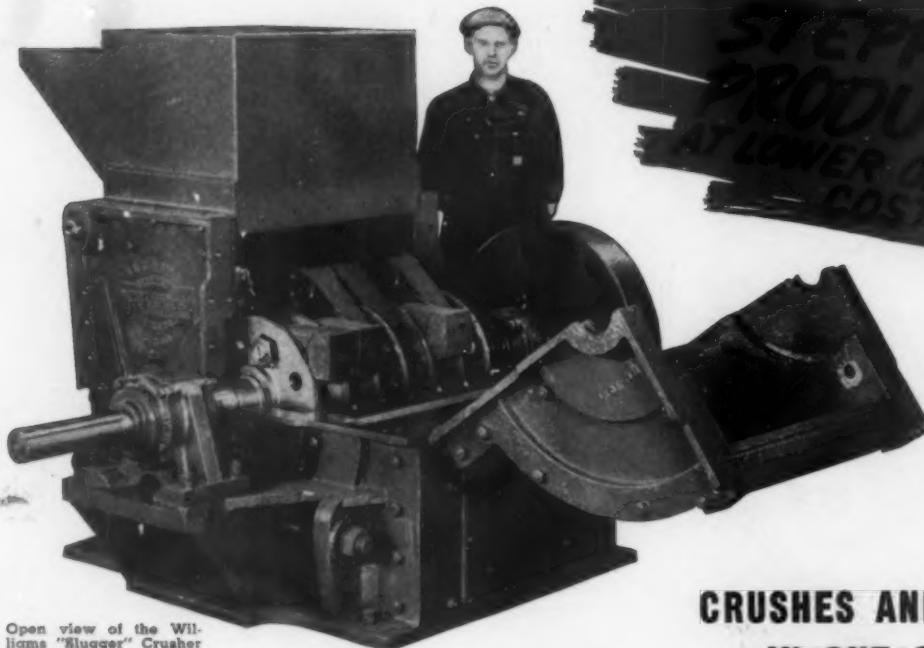
Your sons, husbands and brothers who are standing today upon the battlefronts are fighting for more than victory in war. They are fighting for a new world of freedom and peace.

We, upon whom has been placed the responsibility of leading the American forces, appeal to you with all possible earnestness to invest in War Bonds to the fullest extent of your capacity.

Give us not only the needed implements of war, but the assurance and backing of a united people so necessary to hasten the victory and speed the return of your fighting men.

William B. Leahy
Earl E. Clegg
Dwight D. Eisenhower
C. W. Nimitz
Arthur H. C. ...

MAY 19 1945



Open view of the Williams "Slugger" Crusher showing heavy duty hammers, liners and discs.

**STEPPED-UP
PRODUCTION
AT LOWER OPERATING
COSTS**

CRUSHES AND PULVERIZES IN ONE OPERATION

The **WILLIAMS "SLUGGER"**
CRUSHES "ONE-MAN" SIZE STONE
TO $1\frac{1}{4}$ ", $\frac{3}{4}$ " OR AGSTONE IN
ONE OPERATION

The Williams "Slugger" Crusher and Pulverizer now makes it possible to crush large pieces of stone weighing from 75 to 100 pounds to $1\frac{1}{4}$ ", $\frac{3}{4}$ " or agricultural limestone in one operation. Sledging is eliminated. The unnecessary expense of a primary crusher is eliminated and the costly need for recrushing "overs" is eliminated. With seven sizes to choose from—all sturdily built for long lasting wear—every producer, whether large or small, can profitably install a Williams.

Design Features Include: Discs arranged so hammers can be set out as they wear on end; manganese steel breaker plates adjustable toward the hammers; front end is steel casting, $3\frac{1}{2}$ times stronger than cast iron; 1" thick manganese steel side cover liners.

**WILLIAMS PATENT CRUSHER AND
PULVERIZER CO.**

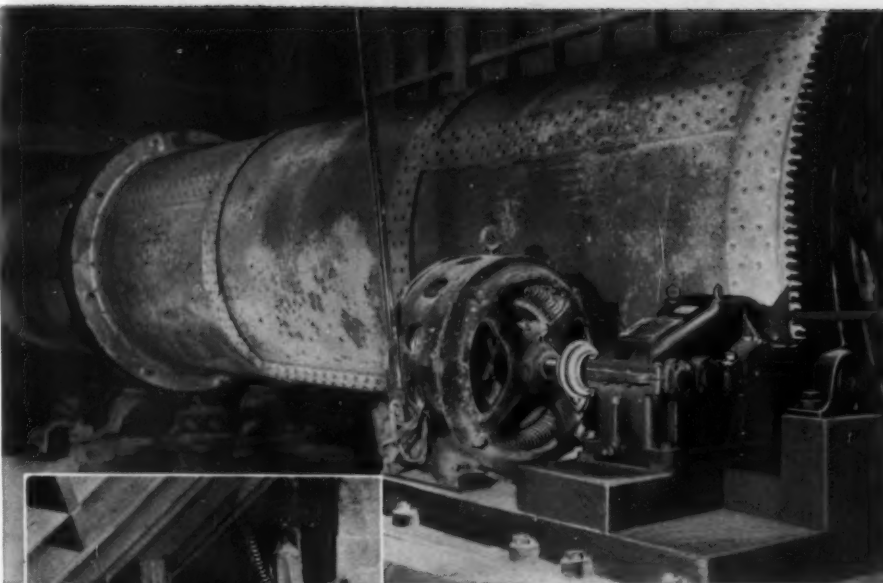
800 St. Louis Ave.

St. Louis (6), Mo.



REG. U.S. PAT. OFF.

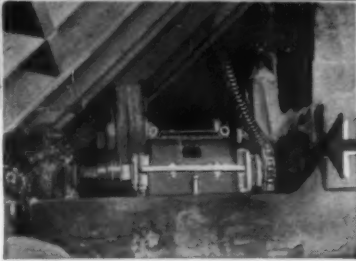
WILLIAMS
OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
WILLIAMS
PATENT CRUSHERS GRINDERS SHREDDERS



← Link-Belt ring gear and pinion furnish final drive to rotary kiln.

Link-Belt herringbone gear speed reducer is direct-connected to motor; low speed shaft, carrying pinion, is supported by ...

← Link-Belt roller bearing pillow block.



Link-Belt herringbone gear speed reducer, coupled to motor. Final reduction through Silver-link roller chain, to bucket elevator.

Link-Belt No. 5, Type B Coupling.

Cuts Maintenance **90%** WITH **LINK-BELT** SPEED REDUCERS!

OPERATING in a continual blizzard of pulverized limestone, these and several other Link-Belt herringbone gear speed reducers have been doing their 10 hours-per-day, year-in-and-year-out, with only the least attention, and no sign of trouble. In fact, the Waukesha Lime and Stone Company, in whose plant they are installed, states that maintenance has been cut "at least 90%," compared to the older type of

drives they replaced on this equipment.

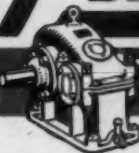
Link-Belt manufactures practically every type of speed reducer, and can recommend the type and size for every application. Let Link-Belt power transmission specialists help you to make your plant more efficient, reduce *your* maintenance!

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in principal cities.

LINK-BELT SPEED REDUCERS

HERRINGBONE
GEAR



MOTORIZED
HELICAL



WORM
GEAR



PREFORMED WIRE ROPE DESERVES TO BE HANDLED WITH CARE. SEE WHAT ACTUALLY HAPPENS IN THESE CROSS-SECTION VIEWS.

GRIP...or



Laughlin "Fist-Grip" Safety Clip holds rope firmly by friction—with hardly any flattening.

CRUSH?



Ordinary U-bolts crush wires, frequently ruining rope ends. (Notice distorted hemp center under "U".)

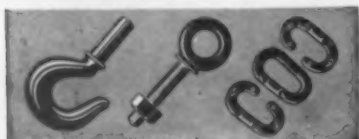
(Nuts tightened to same tension, with torque-indicating wrench in both cases)

"Fist-Grip" Clips protect your rope. 25% fewer can be used, because improved bearing surfaces deliver full rope power. They save time, too, because they go on faster—with any type wrench—and can't be put on backwards. They are the only clips with drop-forged bolts. Order test samples from your distributor today.

Distributed through mill, mine and oil field supply houses. For a complete catalog on Laughlin's wire rope and chain hardware, write to Dept. 4, The Thomas Laughlin Co., Portland 6, Maine.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



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In war or peace
B.F. Goodrich
FIRST IN RUBBER



B.F. Goodrich multiple V-belt drives here outlast gear drives 4 to 1

*Successful experience in textile loom service
points way to increased industrial use*

FOR years, textile men said that V-belt drives couldn't be used on heavy duck looms. And they were right—until recently. The low-stretch, non-resilient V-belts of a few years ago couldn't meet the demands of this severe and exacting service. They were all right for spinner or twister frames—but not for looms.

Then B.F. Goodrich developed the shock absorbing, resilient, high flexing V-belt that is known throughout industry today. Six years ago loom tests

were begun. Since then, B.F. Goodrich multiple V-belt drives have proved in actual service that they offer the following distinct advantages over gear drives for textile looms:

1) *Average gear life, 6 months; average V-belt life, 2 years.* 2) *Sharply reduced maintenance time and costs.* 3) *Smother operation of the delicate looms.* 4) *Reduced noise.* 5) *Reduced time and cost for replacement.* 6) *Shock absorbing qualities not present in positive transmission.* 7) *V-belts absorb peak loads, save and extend*

life of loom parts. 8) *A quick and cheap way of changing loom speed by using a variable pitch pulley.*

Your B.F. Goodrich distributor will be glad to translate these proven advantages into terms of your own power transmission needs. Or if you have any other problem involving the use of rubber, the chances are that it can be solved by one of the 32,000 B.F. Goodrich rubber products. The B.F. Goodrich Company, Industrial Products Division, Akron, Ohio.

B.F. Goodrich
RUBBER and SYNTHETIC products

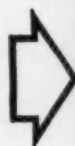
It's like "Tinker to

ALLIS-CHALMERS GIVES YOU "MACHINE TEAMWORK" — because it builds *many types* of equipment for you to select from in teaming up machines to best advantage in your plant!

BOILED DOWN to its simplest terms, "Tinker to Evers to Chance" was the *right* shortstop to the *right* second baseman to the *right* man at first. Similarly, a smooth-flowing operation in mining or processing industries may amount to the *right* primary crusher to the *right* screen to the *right* secondary crusher. Often, getting *exactly* the right equipment for a given spot depends on having a wide choice of machines to select from — such as A-C offers you.

If you have a problem you want solved, or are contemplating installing new equipment, let Allis-Chalmers help you. Contact our nearby district office, or write direct to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

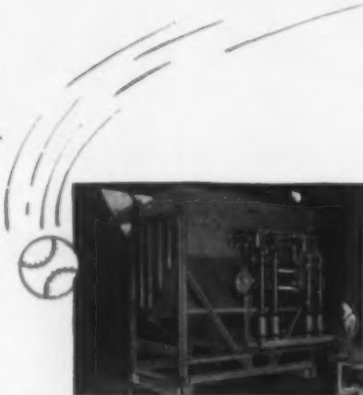
A 1786-C



1 A-C MINE HOISTS, ranging in size from medium to the largest built, are operating on slopes, and over shafts extending more than a mile deep. When equipped with "Regulex" exciter control, voltage can be controlled automatically, assuring uniform acceleration.



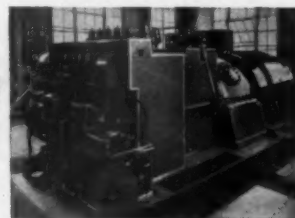
8 GRINDING. More than 3700 A-C Cylindrical Grinding mills are giving better grinding at lower cost all over the world. Over 50 kinds developed — batch, simple overflow, controlled pulp level and screening types — charged with balls, Concavex, or with non-metallic media.



9 CONCENTRATION. A-C engineers and supplies all types of concentration equipment—gravity and flotation machines. Pictured above is a 24" x 60" Conset Jig featuring new design improvements.



10 PYRO-PROCESSING. Trend is toward centralized instrument control embodied in A-C kilns and coolers, reflected in design of dryers, roasters, furnaces, converters and auxiliary equipment.



11 POWER AND ELECTRICAL. A-C builds both steam and hydraulic power plant equipment, turbines, generators, etc. . . also transformers, motor-generators, switchgear, circuit breakers, substations, etc.



WE FIGHT FOR
VICTORY

WE FIGHT FOR
PEACE

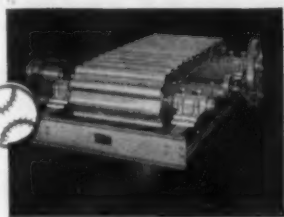
**BASIC EQUIPMENT
FOR CRUSHING & MINING INDUSTRIES:**

ALLIS

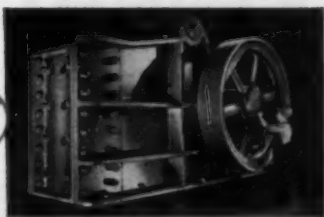
Jaw, Gyratory, Hammer & Roll
Crushers, Ball & Rod Mills

Kilns, Coolers,
Roasters, Dryers

Evers to Chance"...



2 FEEDING. A-C builds a complete line of vibrating and apron feeders and conveyors for handling any size material from reagents to heavy ore tonnages — horizontally, down or up hill.



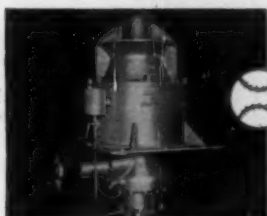
3 PRIMARY CRUSHING. Allis-Chalmers builds Jaw, Gyratory, Roll and Hammer type primary crushers. Jaw type pictured features large receiving opening for blocky feed. Available with non-choking or straight jaw plates.



4 WASHING. A-C offers you 7 different types: Blade Mills, Revolving Scrubbers, Mill Type Scrubbers, Screw and Log Washers, Rotary Scrubber and Vibrating Screens.



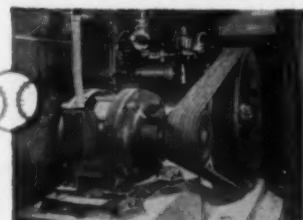
7 MEDIUM SCREENING. "Ripl-Flo" is one of several screens A-C recommends. A 2-bearing screen, it is low in initial cost, low in power requirement and maintenance. Sizes from 3' x 8' to 6' x 16' — 1, 2 or 3 decks.



6 SECONDARY CRUSHING. A-C's Type "R" Crusher features exclusive "Speed Set Control" for quick change of product size — gives you close, instant product control!



5 COARSE SIZING. A-C builds 4 different coarse sizing screens. Pictured is heavy design Style "B" screen. Available in sizes 3' x 6' to 5' x 14' — with 1, 2, or 3 decks.



12 MOTORS AND DRIVES. A-C, originator of the multiple V-belt drive, is America's only builder of both motors and V-belt drives... offers you invaluable "know-how" in teaming them up.



13 PUMPS, BLOWERS, COMPRESSORS. A-C builds Centrifugal Pumps in capacities from 10 to 150,000 gpm, heads to 2500 lbs — also a full line of Blowers, Compressors, Vacuum Pumps.



14 FOR A QUICK PICTURE of the entire broad range of equipment A-C builds for the Metal and Non-Metallic industries, send for Bulletin B6166C. This new bulletin will prove a handy reference for your files.

ALLIS-CHALMERS

Vibrating & Revolving Screens,
Feeders, Conveyors, Hoists

Washers, Scrubbers, Blade
Mills, Centrifugal Pumps

Tractors, Gasoline
Power Units, etc.

Motors, Texrope Drives,
Power Equipment

IN YOUR IMPROVEMENTS AND PUT THESE KENNEDY FEATURES

KVS

KILNS

COOLERS

DRYERS

CRUSHERS

HAMMERMILLS

SCREENS

FEEDERS

CONVEYORS

ELEVATORS

GRINDING MILLS

CLASSIFIERS

WASHERS

DUST COLLECTORS

AIR SEPARATORS



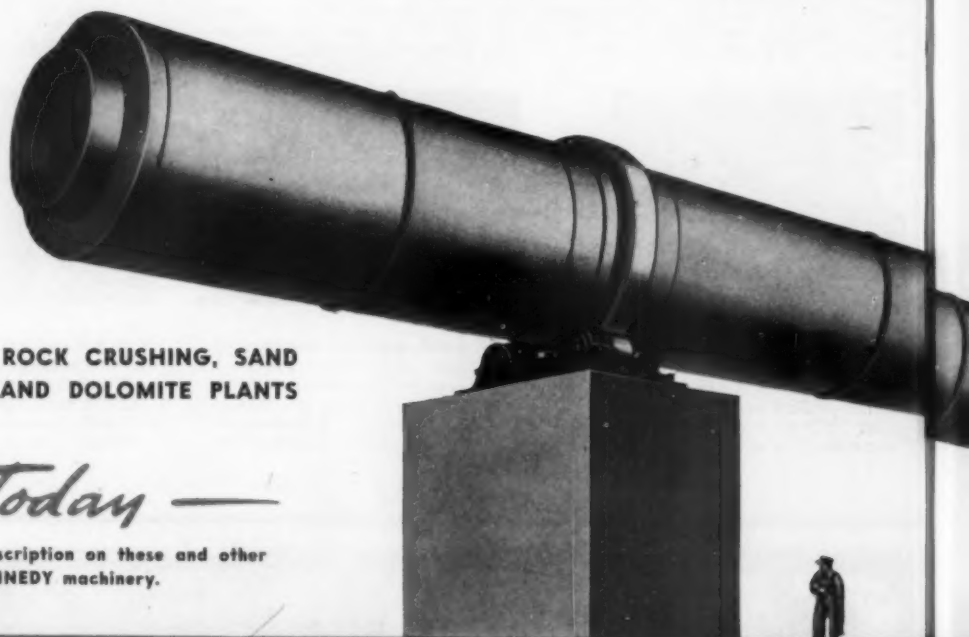
KENNEDY VIBRATION SCREENS



1. Give positive action on the screen cloth without transmitting vibration to supporting members.
2. Are made in two types and several sizes, to meet any screening requirements.

3. Use a principal of vibration that permits lower speeds for large sizes and higher speeds for small sizes.
4. Material is continually turned over when passing along the screen to give efficiency approximating 95%.

These and other advantages embodied in the construction of Kennedy Vibration Screens assure long, low-cost service when you standardize on Kennedy.



COMPLETE CEMENT, ROCK CRUSHING, SAND
AND GRAVEL, LIME AND DOLOMITE PLANTS

Write Today —

for our catalog and description on these and other
types of KENNEDY machinery.

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

EXPANSIONS TO WORK

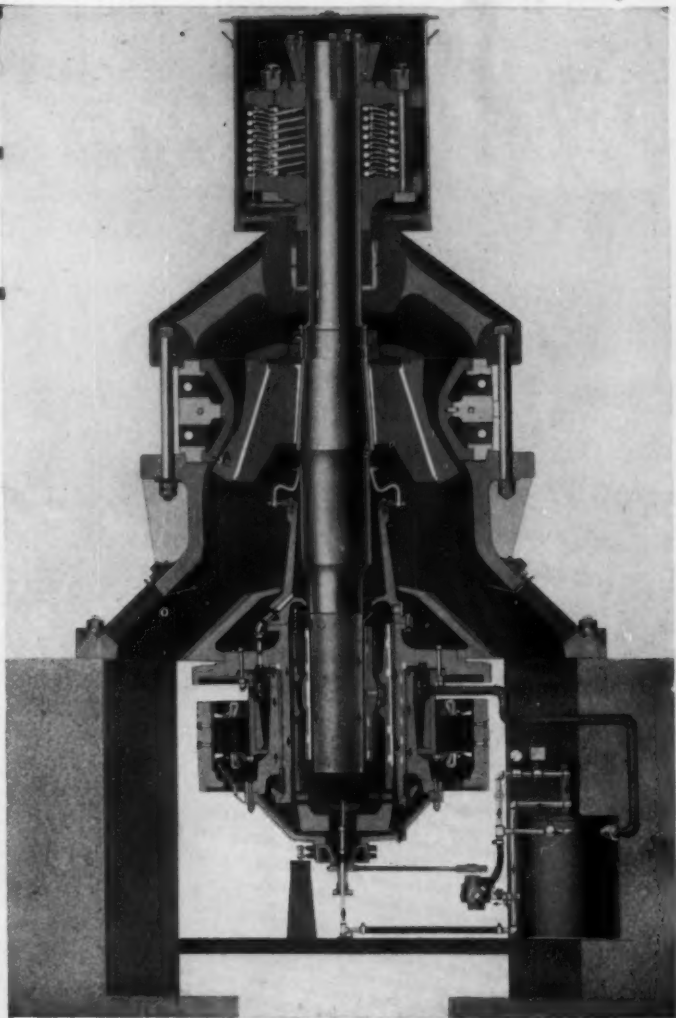
KENNEDY BALL BEARING GEARLESS CRUSHERS

Here is the gyratory crusher which, through a complete unitized design, cuts maintenance costs up to 80% and power requirements in half.

The key to their greater efficiency is in the motor drive assembly which is built in the crusher pulley. A 250% starting torque and a 300% pullout torque enables starting when the crusher is full of stone. The motor, being built in the pulley, adds additional weight to the pulley, and the pulley in turn acts like a fly-wheel by building up kinetic energy and assisting the motor over the peaks.

This simple, direct and positive application is available in a short shaft standard crusher for primary reduction and in a low head type for fine reduction. Both feature force feed lubrication, as shown in red in the illustration at the right.

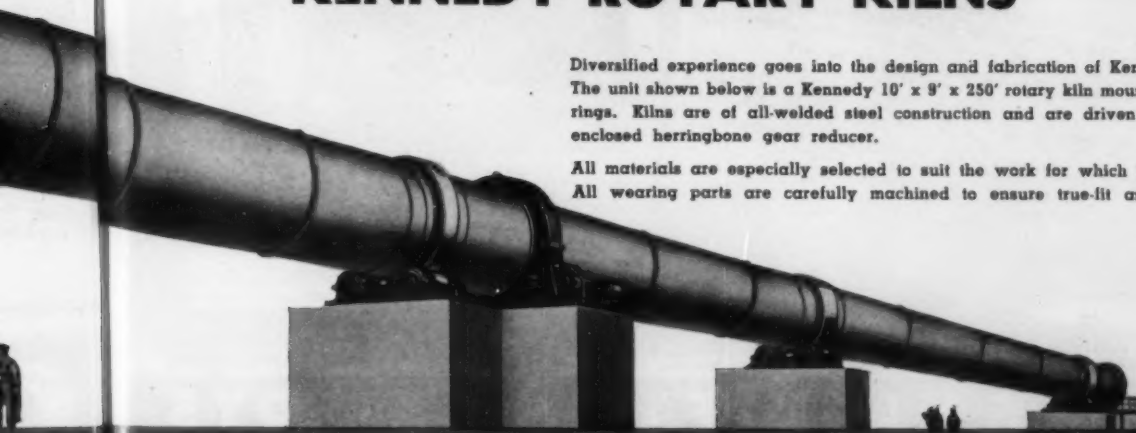
For more tonnage per horsepower make your next crusher a Kennedy.



KENNEDY ROTARY KILNS

Diversified experience goes into the design and fabrication of Kennedy rotary kilns. The unit shown below is a Kennedy 10' x 9' x 250' rotary kiln mounted on four riding rings. Kilns are of all-welded steel construction and are driven through a totally enclosed herringbone gear reducer.

All materials are especially selected to suit the work for which they are intended. All wearing parts are carefully machined to ensure true-fit and best operation.



2 PARK AVENUE • NEW YORK 16, N. Y. FACTORY: DANVILLE, PA.

BLOCK WEAR *on shovel parts*

STOODY SELF-HARDENING

welds maximum wear protection on
Buckets, Track Pads, Rollers,
Idlers, Drive Tumblers

THERE'S one thing about Stody Self-Hardening that you'll find extremely handy. A few pounds kept in stock provides efficient wear protection when you need it and wherever you want it! You'll double the life of ordinary manganese bucket lips and runners; teeth are kept sharp and out to size. Stody Self-Hardening on track rollers maintains full O.D. indefinitely, reduces wear from track slapping and keeps the weight on the rollers rather than idlers and tumblers. Track pad lugs mesh more accurately when hard-faced with Stody Self-Hardening because they're kept on gauge, avoiding lost time replacing thrown tracks. Idlers and drive tumblers are similarly benefited with longer wear and smoother action.

A little Self-Hardening goes a long way too. Solid deposits aren't always necessary—or even desirable. Stringer beads provide effective wear protection on large areas, cut down on hard-facing metal and save hours of welding time. And here are other important considerations: Where you need thick deposits, you get them in one pass—up to $\frac{3}{8}$ " deep with $\frac{1}{4}$ " bare Stody Self-Hardening. Because Stody Self-Hardening is related to manganese, it bonds strongly, is so tough along with its high wear resistance that chipping is eliminated. You'll find it one of the easiest of all hard-facing alloys to apply.

We can't think of a better hard-facing alloy for power shovel protection... Try 100 lbs. of Stody Self-Hardening for your own satisfaction! Cost is only 50c per lb., f.o.b. distributors' warehouse. See any of the 600 U. S. distributors for quick delivery.

STOODY COMPANY
1129 WEST SLAUSON AVE., WHITTIER, CALIFORNIA



BUCKETS receive maximum wear protection when Stody Self-Hardening beads are applied in the same approximate direction as movement of material. When loose earth is handled stringer beads applied in checkerboard patterns increase efficiency.

STOODY HARD-FACING ALLOYS

Retard wear... Save Repair

THE "PIT" CHAMPION

can take it

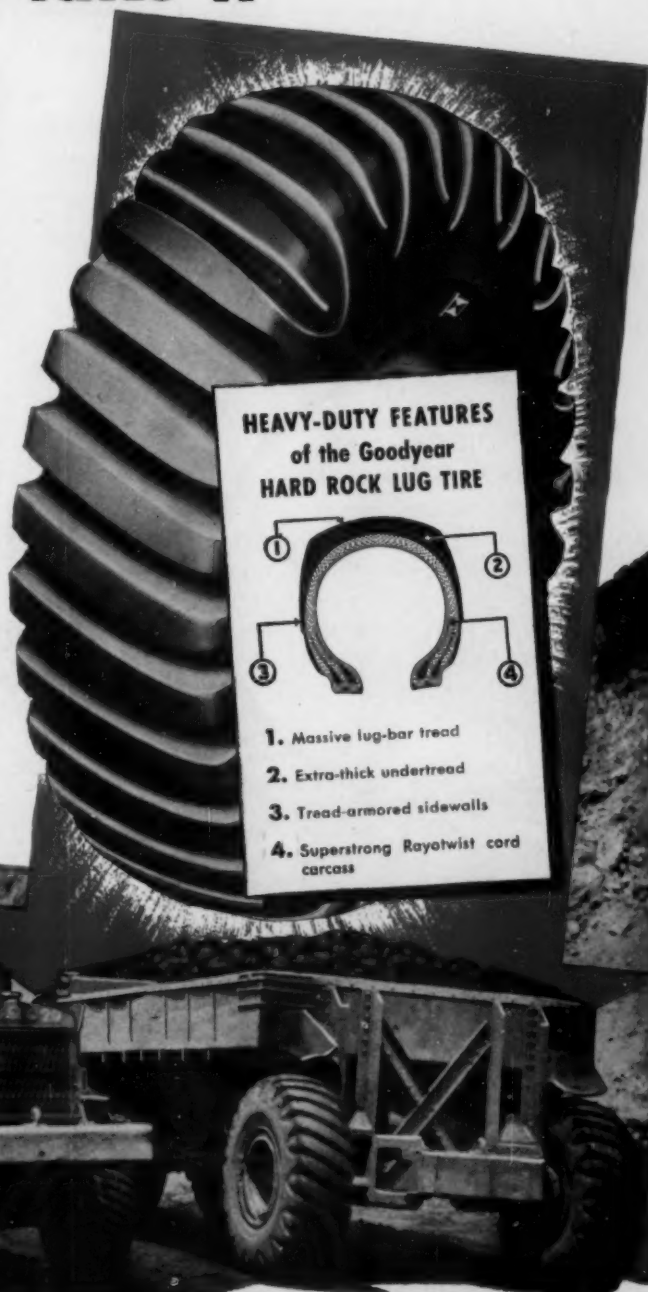
YEARS of standout service prove Goodyear's Hard Rock Lug the best tire for heavy hauling over rocky, tire-killing ground in mine and quarry pit work.

It takes tough pounding longer because it's armored with extra-heavy undertread—and with massive lugs that extend well over the shoulders and *tread-armor* the sidewalls against cuts and gouges.

Always toughest of all, this rugged bruise resister—built from materials available today, including the mandatory amount of synthetic rubber—is now tougher than ever because its Rayotwist body—made from Goodyear's patented rayon cord—is *the strongest body we've ever used in a work tire!*

Add another plus—that self-cleaning, universal two-way tread with no rights nor lefts, same powerful grip reverse or forward—and you have all the reasons why more and more haulers make Goodyear Hard Rock Lugs first choice to move heavy loads in really rough going.

Rayotwist—T. M. The Goodyear T. & R. Co.



HEAVY-DUTY FEATURES of the Goodyear HARD ROCK LUG TIRE



1. Massive lug-bar tread
2. Extra-thick undertread
3. Tread-armored sidewalls
4. Superstrong Rayotwist cord carcass



Goodyear Hard Rock Lug tires on Euclids—hauling coal in strip-mining operation

THE GREATEST NAME IN RUBBER

GOOD YEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

ROCK PRODUCTS, May, 1945

A NEW STANDARD FOR HEAVY-DUTY TRUCKS

The Army called for the roughest, toughest truck that could be built, designed to begin its job where most other trucks stop.

Ward LaFrance has been producing this super truck in volume for Army ordnance. Out of it has come an entirely new standard of heavy-duty truck reliability and performance. Ward LaFrance has been building

good trucks for a quarter of a century, but frankly, never any that could compare with these new commercial models inspired by the design and performance of the Army M1A1 Heavy Wrecker. They are big trucks with pay load capacity ranging up to thirty tons. They are built to take a beating and still stay on the job. They are designed, engineered, and manufactured to establish new standards in low-cost hauling. Before you invest, investigate Ward LaFrance.

FRANCHISES ARE AVAILABLE to aggressive dealers in a number of attractive territories. Leading dealers now handling smaller, non-competitive trucks will be especially interested in the Ward LaFrance dealer plan.

WARD LAFRANCE

TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC.

ELMIRA,



NEW YORK



**BUILD
BETTER**

Postwar

**VACATIONLAND
ROADS!**

with aggregate from a
CEDARAPIDS JUNIOR TANDEM!



Cedarapids

Built by
IOWA

THE IOWA LINE

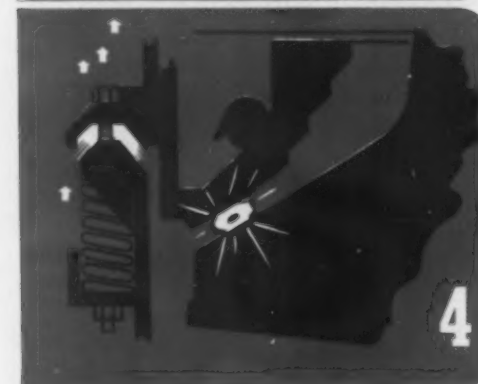
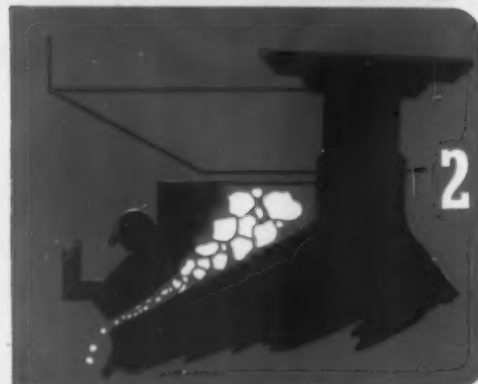
of Material Handling Equipment Includes

- | | |
|--------------------------------------|-----------------------------|
| ROCK AND GRAVEL CRUSHERS | REDUCTION CRUSHERS |
| BELT CONVEYORS | BATCH TYPE ASPHALT PLANTS |
| STEEL BINS | TRAVELING (ROAD MIX) PLANTS |
| BUCKET ELEVATORS | DRAG SCRAPER TANKS |
| VIBRATOR AND REVOLVING SCREENS | WASHING PLANTS |
| STRAIGHT LINE ROCK AND GRAVEL PLANTS | TRACTOR-CRUSHER PLANTS |
| FEEDERS—TRAPS | STEEL TRUCKS AND TRAILERS |
| PORTABLE POWER CONVEYORS | KUBIT IMPACT BREAKERS |
| PORTABLE STONE PLANTS | |
| PORTABLE GRAVEL PLANTS | |

When gasoline rationing becomes a memory and the call of the open road can be answered, the new and improved highways that must be built through remote vacationlands will provide many profitable jobs for contractors with the proper equipment. In the Cedarapids line of portable plants there is just the size and type to fit every aggregate production requirement. The Junior Tandem is a typical example, has plenty of belt capacity to handle all kinds of pit conditions, ample extra screen capacity for those tougher screening jobs, and the extra secondary crushing capacity for the production of either fine or coarse aggregate. The entire plant is mounted on one steel truck chassis equipped with pneumatic tires, ready to move to the mountains, parks, or forests from one job to another. Let your Iowa dealer tell you about the profit opportunities you can have with Cedarapids equipment.



IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa



4 reasons why the **CONE** leads in the fine crushing field...

1 uniform controlled feed

Feed platform with adjustable spout in conjunction with the oscillating feed plate combine to control and uniformly distribute the feed to the crushing cavity.

2 maximum liner utilization

With the Symons process of crushing, the crushing action occurs throughout the entire length of the cavity. Uniform manganese wear means minimum scrap loss and low manganese cost per ton of crushed product.

3 large discharge area

Wide throw of head creates a large opening for free and rapid discharge of crushed fines. This allows rapid entry of new feed into the cavity, an essential factor for big capacity.

4 protection from tramp iron

The circle of heavy springs permits the bowl and adjustment ring to rise should a non-crushable object enter the crusher. This protects the crusher from damage due to tramp iron.

These and other features found only in the Symons Cone make possible the enormous output of fine product which has won for this crusher the position of leadership in the fine crushing field.

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN

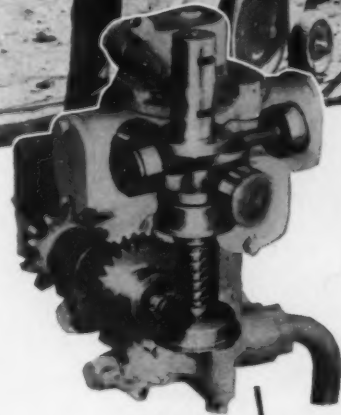
NEW YORK • LOS ANGELES • LONDON • TORONTO



SYMONS CONE CRUSHERS

HOW TO DRILL

More Footage FASTER!



• The one man above is operating two Sullivan Lightweight wagon drills and a 210 cu. ft. Sullivan Plus Portable and drilling 600 ft. daily of 18 to 24 ft. holes in soft limestone.

• The Sullivan "Piston-Motor" Feed is a simple, four-cylinder, reversible air motor that provides an infinite range of feed pressures and speeds with plenty of power for pulling stuck steel.

ON JOBS that you would ordinarily do with hand-held drills you'll get more footage and get it faster with less manpower by using Sullivan "Lightweight" Wagon Drills. All the burden of drilling is taken from the arms of the operator and put on an independent air motor and feed-chain which provide an even, continuous and greater pressure on drill bit. One man operating a 75 lb. drill on a Sullivan LIGHTWEIGHT will drill as much footage as two men each using a 55 lb. hand-held drill.

Pneumatic-tired wheels make them easy to handle. Simple, rugged, positive-locking brakes eliminate anchor pins and reduce set-up delays leaving more time for actual drilling.

The Sullivan diesel-powered, 210-cubic foot, two-stage, "plus portable" shown is typical of the portable compressors which are supplying air power for operating Sullivan wagon drills, hand-held drills, paving breakers, spaders, trench diggers, sheeting drivers, plug drills and other Sullivan contractors' tools. They contain all the features that only Sullivan can give you: two-stage compression, ball main bearings, controlled air cooling, super intercooling, micro lift valves that last six to eight times longer, and forced lubrication that reaches every bearing and working surface.

Ask your Sullivan representative for bulletins on wagon drills and portable compressors, for details on how they save manpower, time and maintenance. There's a representative in every principal city.

SULLIVAN MACHINERY COMPANY, Michigan City, Indiana
In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario

PRODUCTS:

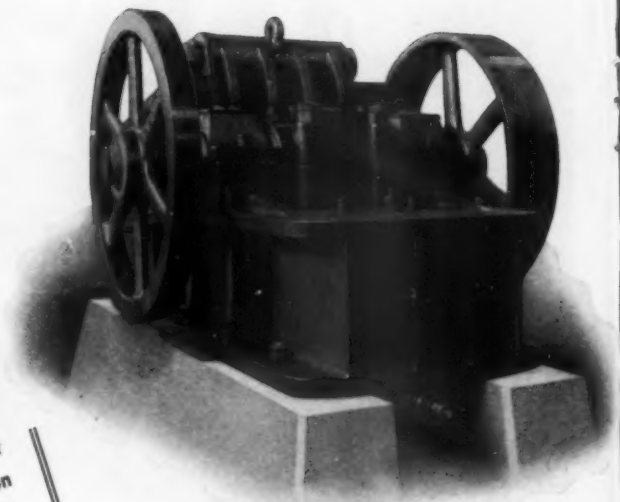
Portable Compressors • Stationary Compressors • Rock Drills • Wagon Drills • Core Drills • Portable Hoists • Paving Breakers • Trench Diggers • Sheeting Drivers • and other Pneumatic Tools

A world-wide organization . . . established 1851

SULLIVAN

OFFICES { Birmingham • Boston • Butte • Chicago • Claremont • Dallas • Denver • Duluth • El Paso • Huntington • Knoxville • Los Angeles • Middletown • New York • Philadelphia • Pittsburgh • Portland • Salt Lake City • San Francisco • Seattle • Spokane • St. Louis • Washington, D. C.

A Lightweight for a Heavyweight Job



Impossible you say! Not with a Traylor Type H Blake Jaw Crusher. True, it is built lighter than machines with heavy cast iron frames, but, it is stronger and it is an excellent producer as well as being economical in operation.

Among its outstanding features are:

- Welded Steel Frame — Scientifically Reinforced
- Cast Steel Swing Jaw and Pitman
- Improved Swing Jaw Suspension
- Manganese Steel Curved Jaw Plates
- Eight Sizes — 8" x 12" to 30" x 42" —
- to choose from to fit your needs.

There are many other features which make this a unique crusher and we suggest you write, asking our representative to call, or

Ask for Bulletin No. 2105.



WE BUILD

- Rotary Kilns
- Rotary Coolers
- Rotary Dryers
- Rotary Slakers
- Scrubbers
- Evaporators
- Jaw Crushers
- Gyratory Crushers
- Reduction Crushers
- Crushing Rolls
- Grinding Mills
- Ball Mills
- Rod Mills
- Tube Mills
- Pug Mills
- Wash Mills
- Feeders
- Rotary Screens
- Elevators

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ENGINEERING & MANUFACTURING CO.

MAIN OFFICE AND WORKS — ALLENTOWN, PENNA., U.S.A.

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551 Howe St., Vancouver, B. C.

LOS ANGELES
919 Chester Williams Bldg.

SPOKANE
S. 2707 Rhyolite Rd.

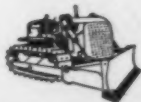
Export Department—104 Pearl St., New York City, Foreign Sales Agencies: London, Lima, Rio de Janeiro, Buenos Aires, Santiago, Antofagasta, Oruro, Montevideo, La Paz

SPOTTING THE MARK



That Means LOWEST POSSIBLE COST
PER YARD . . . PER TON . . . PER ACRE !

When the time comes to buy new equipment for tomorrow's earthmoving and land clearing jobs, it will pay you to remember the mark LPC, as your guide to lowest possible cost. For LPC stands for LaPlant-Choate—the job-proved line of tractor equipment that's known and respected the world over for its outstanding performance on thousands of tough jobs. Designed and built by "specialists" with over 34 years of practical "know-how," LaPlant-Choate equipment will continue to be a step ahead in improvements that assure lowest possible cost per dollar invested. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.



ALL TYPES OF DOZERS*—Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.



LARGE OR SMALL SCRAPERS—Hydraulic or cable operated, front or rear dump, for use with wheel or track-type tractors.



CABLE OPERATED RIPPERS—For ripping up hard ground, shale or concrete to facilitate loading with "Carrimor" Scrapers.



LAND CLEARING TOOLS—A complete line of Brush Cutters, Tree dozers, Rootcutters and Brush Rakes—all interchangeable.

*Again in '44, LaPlant-Choate delivered more dozers to the armed forces and other essential users than any other company in the industry—almost as many as all the other manufacturers combined



LAPLANT

EARTHMOVING AND LAND



CHOATE

CLEARING EQUIPMENT

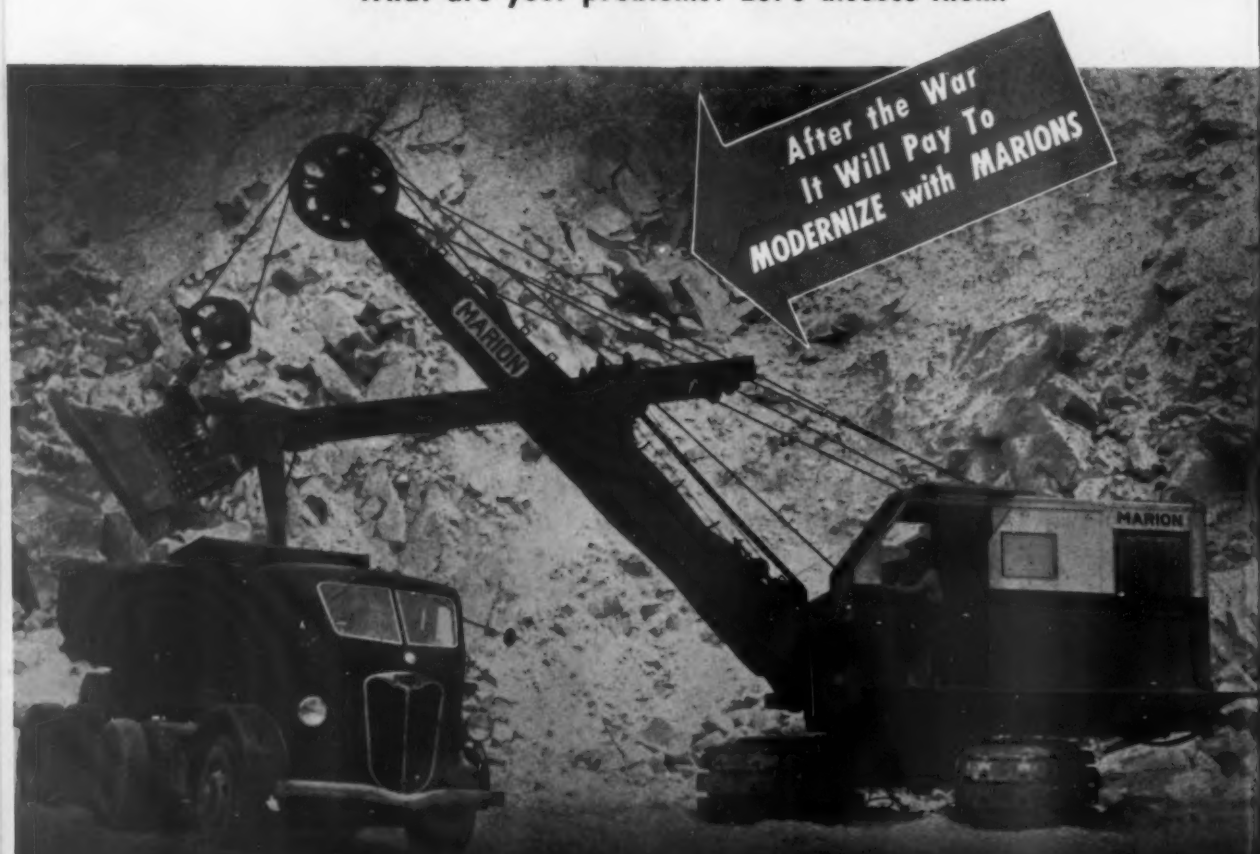
Rock is "Duck Soup" FOR **MARION** SHOVELS

15 YEARS AGO we said:

"MARION is a real rock shovel".

MARIONS have stood the test of time and always
will be the leader in rock or dirt digging.

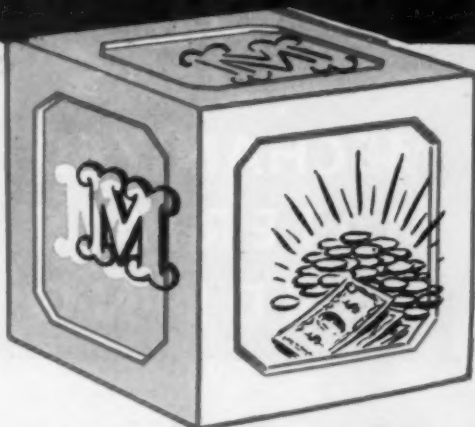
What are your problems? Let's discuss them.



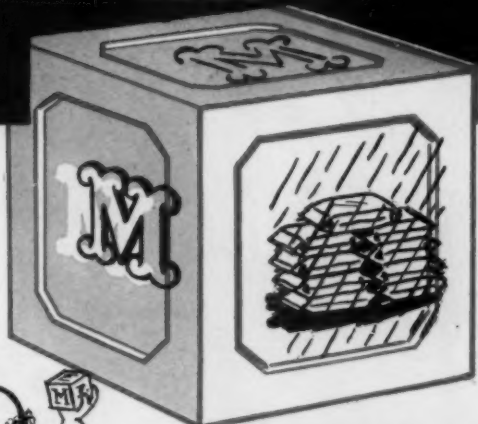
After the War
It Will Pay To
MODERNIZE with MARIONS

THE MARION STEAM SHOVEL CO. • MARION, OHIO
SHOVELS • DRAGLINES • CRANES • PULL-SHOVELS
CLAMSHELLS • WALKERS • *from 3/4 cu. yd. to 35 cu. yds.*

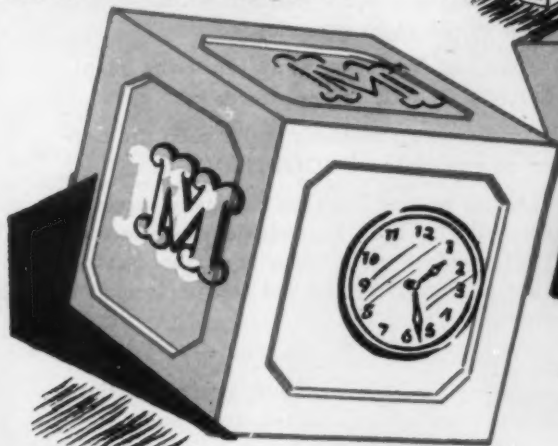
Can you name the four **M**'s... that Multiwalls save?



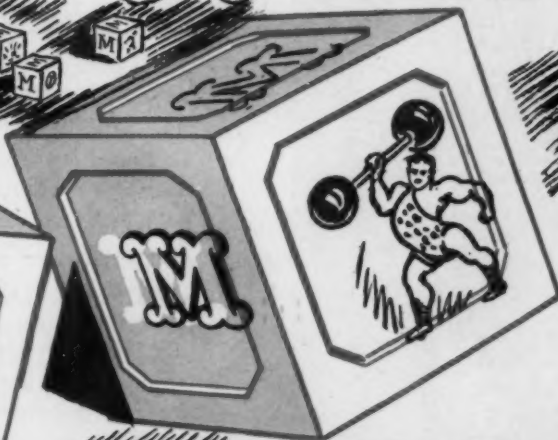
1 MONEY. Aside from their initial low cost, St. Regis Multiwall paper bags save M-O-N-E-Y for other important reasons. These bags prevent losses due to sifting, retention, and infestation. They help keep storage rooms clean and they reduce labor and handling costs.



2 MATERIALS. Multiwalls save materials. These bags are tight, sturdy and moisture-resistant. They protect products from damaging dampness and rough handling in transit and in storage.



3 MINUTES are also saved by using Multiwall Paper Bags. These bags are quickly filled and quickly loaded... quickly and easily opened, too.



4 MANPOWER is perhaps the most important saving which Multiwall bags and bag-packing machines offer today. St. Regis bag-packing systems—including the sewn pack, valve pack and tied pack—actually enable more work to be accomplished with less men.

The St. Regis Paper Company offers you a complete packaging service. Our packaging engineers will be glad to cooperate with you in the development of a packaging system which will be custom-made to fit your individual requirements.

For complete information call your nearest St. Regis office today.

MULTIWALL
MULTIPLY PROTECTION • MULTIPLY SALEABILITY
ST. REGIS PAPER COMPANY
TABBART CORPORATION

NEW YORK 17: 230 Park Ave.

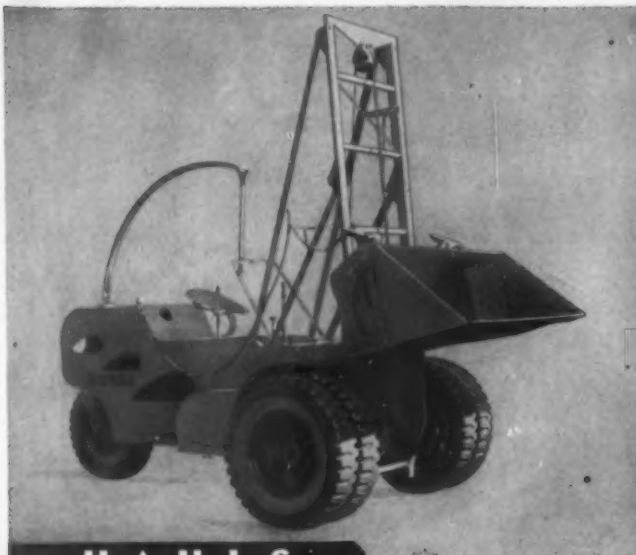
CHICAGO 1: 230 No. Michigan Ave.

BALTIMORE 2: 2491 O'Sullivan Bldg. SAN FRANCISCO 4: 1 Montgomery St.

100 CANADA:

St. Regis Paper Co. (Can.) Ltd.
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**OPENS NEW
CHANNELS**
for

**MECHANIZED
MATERIALS
HANDLING**

HAULS



SCOOPS



LIFTS



DUMPS

INSIDE OR OUT

**SAFE • EFFICIENT • ECONOMICAL
HANDLING OF GOODS**

To Save Valuable Manhours you'll find SCOOPMOBILE an important step in the right direction.

To Speed Up Your Job Operation you'll want the adaptability of a SCOOPMOBILE to your needs.

To Improve Your Handling Methods you'll need the capable mobility of an economical SCOOPMOBILE.

SCOOPMOBILE has proven itself on the many types of jobs it now serves. The safe dependable operation of SCOOPMOBILE with its many time and labor saving features is giving universal service and top performance to satisfied owners.

The practical machine for handling sand, gravel, crushed rock, dirt, sawdust, iron ore, fertilizer, coal, snow, etc.

*Write the factory for complete details
and the name of the dealer nearest you.*

SCOOPMOBILE

KEEPS MATERIALS ON THE MOVE

**BUGGYMOBILE
MIXERMOBILE
SCOOPMOBILE**

MIXERMOBILE

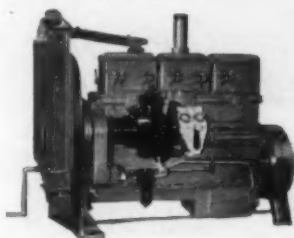
• MANUFACTURERS •

6855 N. E. HALSEY STREET • • PORTLAND 16, OREGON



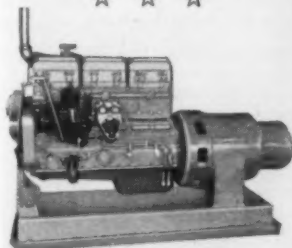
Model H Cummins Diesel is offered in both four and six-cylinder arrangements, developing maximum output of 100 and 150 hp., respectively. This engine is manufactured in a complete line of industrial and automotive models, such as the Model HP-600 power unit, shown above, and Model HBI-600, right, for wheel or track-mounted equipment.

★ ★ ★



The Model HIP-600 is an open type power unit incorporating the same basic engine as that described above. It has a $4\frac{7}{8}$ " bore and 6" stroke, the six-cylinder unit having a piston displacement of 672 cu. in., and the four-cylinder, 448 cu. in.

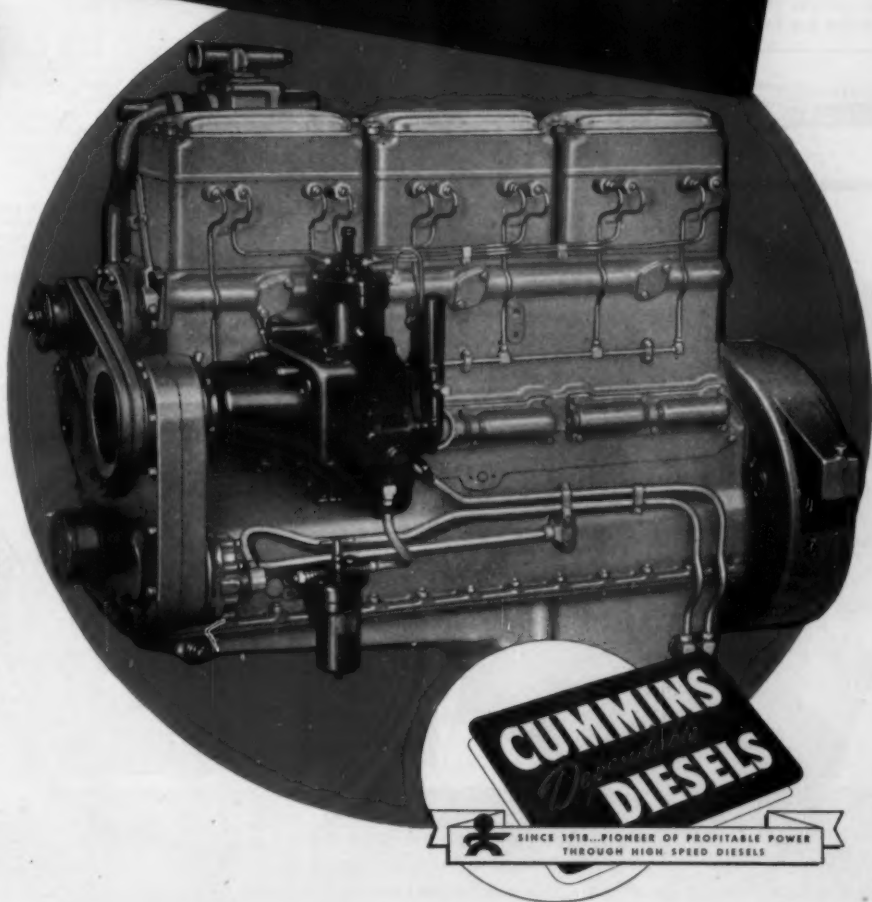
★ ★ ★



The Model HGA-601 is an AC generating set, rated 50 kw. at 1200 rpm. The four-cylinder Model H generating set is rated 30 kw. at 1200 rpm. Both four and six-cylinder sets are also available for DC operations.

"The job you want done is now being done by Cummins Dependable Diesels." That is a statement of fact... backed by a 12-year demonstration of reliable, low-cost performance... covering all types of heavy-duty equipment and power applications in the construction and aggregates industries — bar none!

CUMMINS ENGINE COMPANY, INC.
Columbus, Indiana



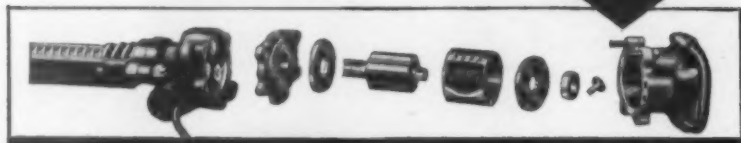
More real footage for less money
WITH **Thor** DRIFTERS!

POWERFUL ROTATION AND HOLE BLOWING

Stronger rotation and exceptional hole-cleaning ability are the reasons for Thor Drifters' more-footage performance and extra drilling speed.

Extra-heavy rifle bar assembly and positive-set ratchet-action, plus balanced-power piston action insures dependable rotation to deliver a fresh cut with every blow for rapid advance into the hardest rock.

The exceptional hole-cleaning ability of Thor Drifters adds still further to the penetration rate. Thor design applies a constant jet of air and water at the drill point; provides an extra blast of air when really needed to keep the hole perfectly clean at all times. Automatic lubrication—low air consumption—minimum vibration all serve to make Thor your best bet for fast, low cost drilling.



Thor Drifters are made in two sizes—medium or heavy duty, with hand or power feed.



HERE
IT
IS!

8 REASONS WHY THOR POWER-FEED DRIFTERS SPEED THE DRILLING CYCLE

1. Eliminates Hand Cranking
2. Gives Greater Drilling Performance
3. Reduces Dead Time—Cuts Costs
4. Greater Freedom for Operator
5. Simple to Operate
6. Quicker Steel Changes
7. Extremely Low in Operating Cost
8. Speed of Feed Is Semi-Automatic

THE INSIDE STORY OF THOR POWER-FEED!

1. POWER-FEED has an independent, balanced rotary air motor, mounted directly and rigidly on rear end of guide shell.
2. A SUBSTANTIAL PLANETARY GEARING transmits the power from rotor directly to feed screw.
3. ROTOR is perfectly aligned with feed screw by means of splined driving unit. Mechanism is free from shock and thrust.
4. BALL AND ROLLER BEARINGS throughout.
5. ENTIRE POWER-FEED UNIT is completely sealed against dirt.
6. ONE SIMPLE THROTTLE VALVE controls all feeding functions—(1) Rapid Return, (2) Neutral, (3) Slow Drilling, (4) Fast Drilling, and (5) Rapid Advance.
7. SUBSTANTIAL COIL SPRINGS mounted at each end of shell eliminate shock to drill in extreme forward or rear positions.

THESE FEATURES MEAN POWER FOR SPEED IN ALL THOR DRIFTERS

MEASURED AIR—The Thor short-travel tubular valve controls air input to .00025"—positive action get full measure of power from ALL the air.

BALANCED POWER—Precise control of air input provides a full cushion of live air at both ends of piston stroke for fully balanced—full-power performance.

SMOOTH OPERATION—Every stroke is powered by the same measured quantity of air for smooth, uniform operation.

OTHER THOR AIR TOOLS

- Sinker Rock Drills
- Sump Pumps
- Sloper Rock Drills
- High Cutters
- Paving Breakers
- Saw

For complete specifications write for catalog No. 42A.

Thor

PORTABLE
Electric & Pneumatic
TOOLS

INDEPENDENT PNEUMATIC TOOL CO.
600 W. Jackson Blvd., Chicago 6, Ill.

New York • Los Angeles • San Francisco • Salt Lake City • Seattle • Denver



Phantom view shows lube-oil path in red

"Put **DOWN** that oil can, Lube-oil Reuben!"

No need to hand-oil any part of a Hendy Series 50 Diesel! It's completely enclosed, so *all* parts are oiled from the pressure-lubrication system . . . automatically . . . in correct amounts, neither too much nor too little.

Series 50 Diesels have advantages never before combined in a single design. Besides full pressure lubrication, they have overhead camshafts, unit fuel pumps and injectors, oil-cooled pistons, and many other features.

Now, for the first time, you can have the benefit of *all* these features in *one* tested and reliable Diesel. For complete information, mail the coupon today to Joshua Hendy Iron Works, Sunnyvale, California.

Send for NEW Diesel Booklet
No Obligation

JOSHUA HENDY IRON WORKS
SUNNYVALE, CALIFORNIA

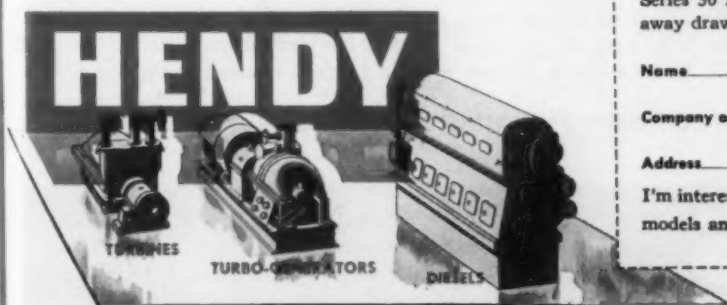
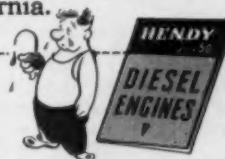
Mail me your new booklet that completely describes the Series 50 Diesel, with photographs and cross-section cut-away drawings showing the design of all major parts.

Name _____ Position _____

Company or business _____

Address _____

I'm interested in Marine ☐ Stationary ☐ Diesel-electric ☐
models and in hp ranges from 190-250 ☐ from 250 up ☐

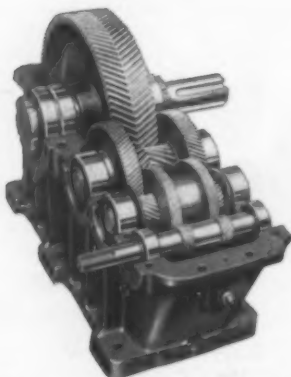
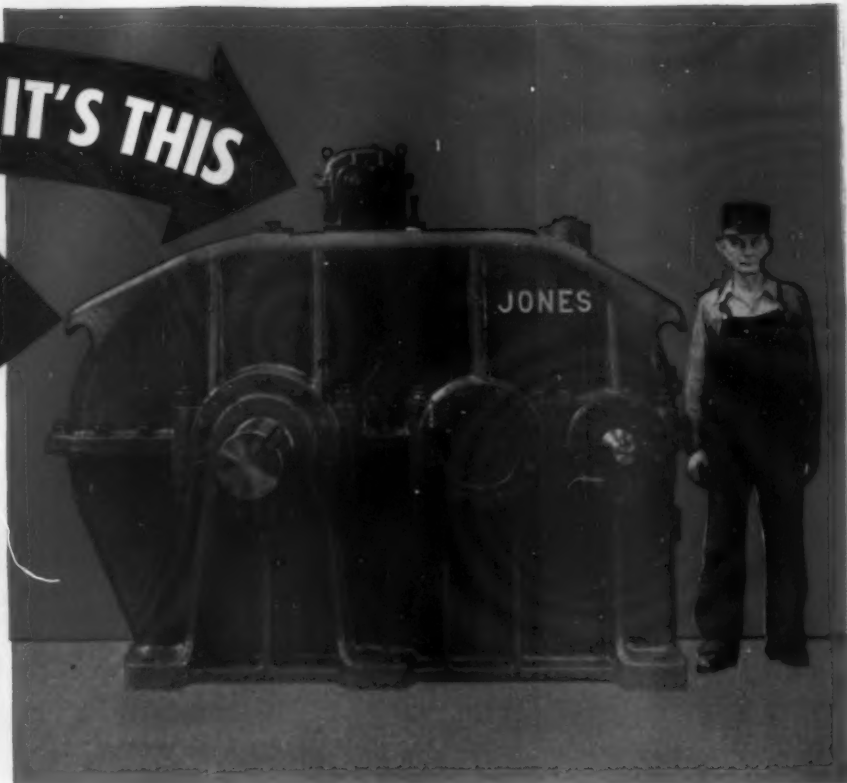


115-D-17

WHETHER IT'S THIS

-OR THIS

**... both
will stand
up under
war time
conditions**



The above view of a Jones Triple Reduction Herringbone Speed Reducer is typical of a line that is noted for advanced design, superior materials, precision workmanship.



TWENTY FOUR hours a day operation plus loading up to rated capacity or beyond are testing speed reducers in every type of service.

Jones Herringbone Speed Reducers are establishing remarkable service records under these conditions. One reason of course is the fact that Jones Reducers have always been rated in accordance with the recommended practice of the American Gear Manufacturers Association.

With this conservative rating policy goes sturdiness, compactness, symmetry and balance—all factors that influence maximum efficiency, long life and improved performance.

Jones Herringbone Gear Speed Reducers are built in a wide range of ratios and ratings to cover every requirement. Single (Type SH) reducers in standard ratios range from 1.25 to 1 up to 11 to 1 in ratings from 1.3 to 440 H.P. Double (Type DH) re-

ducers are built in standard ratios from 10.9 to 1 up to 72 to 1 in ratings from 0.5 to 275 H.P. The triple reduction reducers (Type TH) cover a range of ratios from 86.9 to 1 up to 355.8 to 1 in ratings from 0.3 to 78 H.P.

All these reducers have heat treated gears, ground shafts and are mounted with anti-friction bearings throughout. Cast iron bases are available for all variations of motor assembly.

For complete information on both standard and special applications of Jones Herringbone Reducers ask for Catalog No. 70. This 128 page catalog is a comprehensive technical treatise on the whole subject of Herringbone Reducer application for all conditions of service. If you have any type of drive problem that might call for Herringbone gears we shall be pleased to send you a copy.

W. A. JONES FOUNDRY & MACHINE CO., 4447 Roosevelt Road, Chicago, Ill.

Jones

HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS • PULLEYS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION
PIWLOW BLOCKS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES

How RPM DELO Oil reduces engine wear



NEW PISTON RING

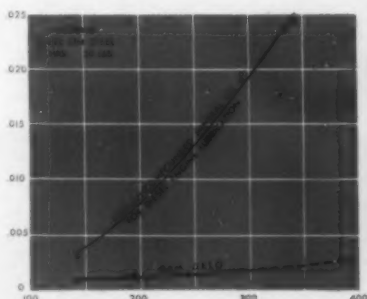


SCRATCHING WITH UNCOMPOUNDED MINERAL OIL

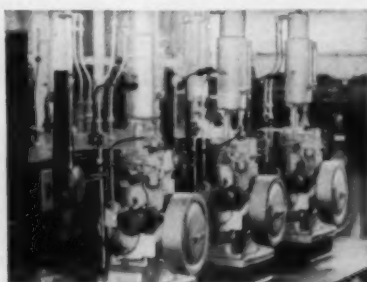


RING USED WITH RPM DELO OIL

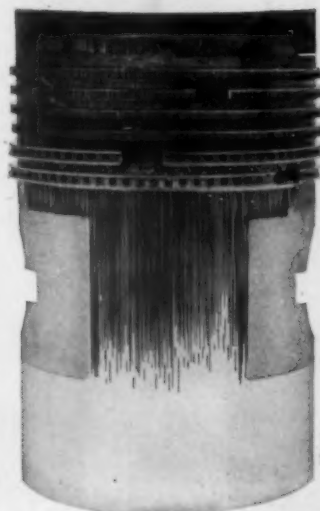
The actual photographs above, in which the lines are merely emphasized by printing in red, are typical of the results obtained when testing RPM DELO Diesel Engine Lubricating Oil against ordinary Diesel oils. Because RPM DELO Oil contains a patented metal-adhering compound, it clings to hot cylinder spots that other oils leave dry, protecting rings and liners against excessive wear.



Confirming actual tests in engines are such laboratory tests as this with a Kinetic Oiliness Testing machine. RPM DELO Oil has far lower wear rate than the best uncompounded oil.



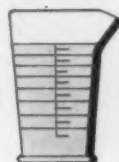
Here is a battery of special test engines in California Research Corporation's laboratories. They are used to determine the anti-ring-sticking properties of oils.



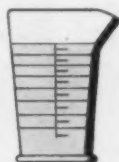
Here is a piston used in a special break-in test with straight mineral oil. This actual photo, with scratches emphasized in red, shows how rings, lands and skirt are badly scratched.



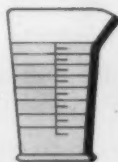
This piston went through the same test as the one above—but with RPM DELO Oil. No scratching occurred and every ring is free. RPM DELO Oil's film prevents scratching and scoring.



Detergent compound to clean engine.



Anti-oxidant to prevent gum and sludge.



Wear-reducing compound.



STANDARD OF CALIFORNIA

RPM DELO Oil has world-wide distribution, marketed under following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, Imperial RPM DELO (CONCENTRATE)

For more technical information about this revolutionary Diesel Engine lubricating oil, write to Standard of California, 225 Bush St., San Francisco 20, California, or California Commercial Co., 30 Rockefeller Plaza, New York 20, N. Y.



TRACTOR POWER IS "MUST" POWER

Above: Fast-working, powerful Allis-Chalmers Diesel speeds stripping on an Indiana operation. Below: Same Diesel quickly repairs a road cave-in that threatened to disrupt hauling.

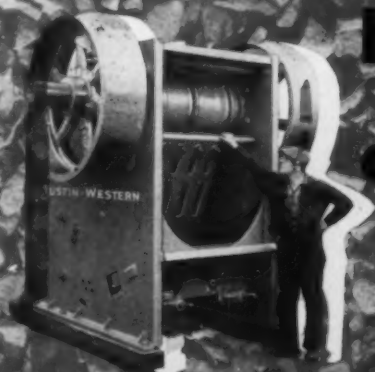
Tractors are "must" equipment for modern operators. Wherever used they increase profits, make quarrying easier, faster. Working with bulldozers, they dig and push material, heave trees, stumps, rocks aside — your cheapest possible handling method. Where earth has to be moved over a distance, they work with scrapers . . . dig and load quickly, travel over roughest going taking steep grades in stride, dump exactly where wanted. Important, too, is the ability of tractors to move and spot heavy machinery.

If you haven't as yet investigated the possibilities of tractor power . . . it will pay you to do so now. Let your Allis-Chalmers dealer prove how it will lower your cost of operation, speed up production and increase your profits.

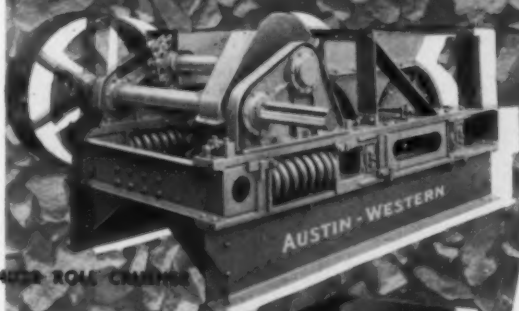


ALLIS-CHALMERS
TRACTOR DIVISION—MILWAUKEE 1, U.S.A.

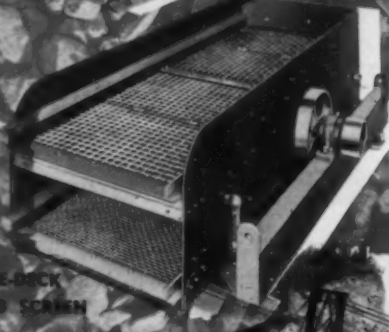
Making little ones
out of *big* ones



2500 PRIMARY BREAKER



4000 ROLL CRUSHER



DOUBLE-DECK
VIBRATING SCREEN

Key to the successful and profitable operation of any plant is the crusher itself... reason enough for the painstaking engineering behind every Austin-Western jaw and roll model.

Exclusive features increase output, assure constant operation and reduce maintenance costs.

The same skilled engineering characterizes each and every Austin-Western crushing and screening plant, from the most simple to the most elaborate; each tailor-made to the requirements of a particular production problem.

AUSTIN-WESTERN COMPANY, AURORA, ILL.



BUILDERS OF ROAD MACHINERY

Austin Western
SINCE 1880

BUY MORE
WAR BONDS

DRILL

*in any position
and at any angle*



with the
CLEVELAND
DR30

Pneumatic tires now obtainable if specified by purchaser in his application for priority to Construction Machinery Branch of War Production Board.

★ By merely loosening two nuts, the Cleveland DR30 Wagon Drill can be swung forward or back and from side to side. Then set it as you wish—straight down, flat, breast high, higher than your head, within 4" of ground level, or even straight up. • Here are a few more important features of the DR30:

- ★ Feed capacity over 8 feet, permitting 6-foot steel changes; handles depths to over 25 feet.
- ★ Recoil device holds machine to its work, increases drilling speed 10-25%.
- ★ Forward leg point holds the drill and steel in line on all kinds of holes.
- ★ Centralizer keeps steel from "walking" when starting hole, prevents breakage of bit points.

- ★ Twin jack-screw mechanism permits easy moving of U-bar, shortens set-up time.
- ★ Main wheels swivel 90° for line drilling, and 180° to obtain narrower tread.

Write for Bulletin 132 that fully describes the most popular wagon drill ever built.

BRANCH OFFICES

Birmingham 1, Ala.	Los Angeles 11, Calif.	Salt Lake City 1, Utah
Butte, Mont.	Newton Highlands 61, Mass.	San Francisco 3, Calif.
Denver 2, Colo.	New York 6, N. Y.	St. Louis 3, Mo.
El Paso, Texas	Philadelphia 30, Pa.	Wallace, Idaho
Ironwood, Mich.		Washington 5, D. C.
Lexington 19, Ky.		

CANADIAN DISTRIBUTORS

Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.
BUY U. S. WAR BONDS AND STAMPS

THE CLEVELAND ROCK DRILL COMPANY

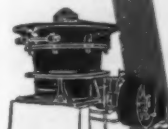
Division of The Cleveland Pneumatic Tool Company

CABLE ADDRESS: "ROCKDRILL"

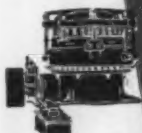
CLEVELAND 5, OHIO.

LEADERS IN DRILLING EQUIPMENT

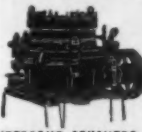
WILL YOUR PLANT BE *ready* to meet *after-the-war* COMPETITION?



PRIMARY BREAKERS



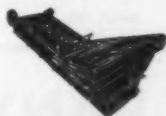
GYRASPHERE CRUSHERS



INTERCONE CRUSHERS



JAW CRUSHERS



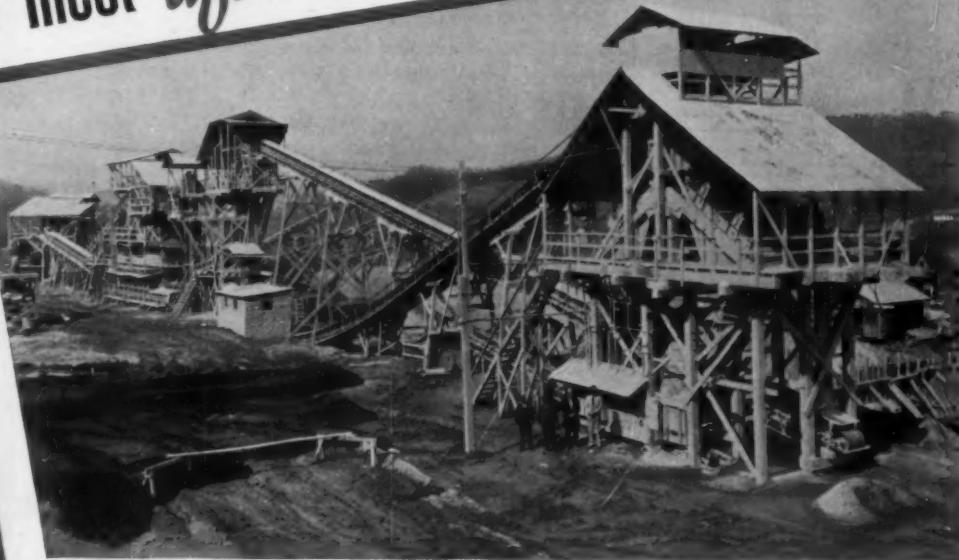
SAND CLASSIFIERS



PULSATOR VIBRATING SCREENS



HEAVY DUTY FEEDERS



Complete modern Tel-smith plant
... producing both coarse and
fine aggregates in several sizes.

● AFTER VICTORY your plant will face a changed market. Peacetime construction contracts and customers will be different. Competition will be keener. Such changes call for plant planning *now!* Rearrangements and additional equipment will be needed. For example, more re-crushing, screening, washing capacity... to produce the smaller sizes, in the quantities and quality your market demands. Modernize with Tel-smith equipment. Give your plant this necessary product flexibility. Boost its output with Tel-smith big capacity, free-from-grief, continuous, fast operation. Less power is required. Upkeep is lower. Tel-smith equipment keeps your production costs down to a figure that insures you a good profit. Tel-smith's 40 years of equipment-building complete-plant-engineering *know-how* is at your disposal. Write us in detail; or send for Bulletin E-11.

TELSMITH

Equipment

FOR SAND, GRAVEL AND ROCK CRUSHING PLANTS

SMITH ENGINEERING WORKS, 508 EAST CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

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Philadelphia 2, Pa.

247 Third Street
Cambridge 42, Mass.

Boeck Eqp. Co.
Milwaukee 3, Wis.

Mines Eng. & Eqp. Co.
San Francisco 4—Los Angeles 14

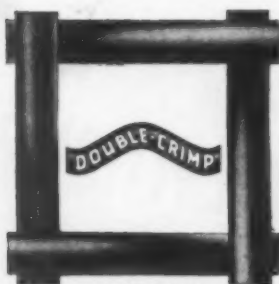
Brandels M. & S. Co.
Louisville 8, Ky.

Rish Equipment Co.
Charleston 22, & Clarkburg, W. Va.

Rish Equipment Co.
Roanoke 7, & Richmond 10, Va.

North Carolina Eqp. Co.
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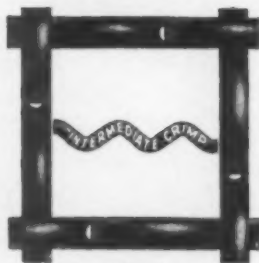
Wilson-Weemer-Wilkinson Co.
Knoxville 8, & Nashville 6, Tenn.



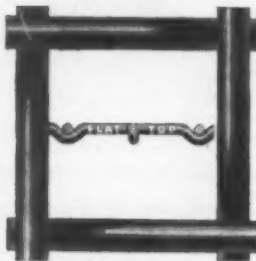
Double-Crimp



Arch-Crimp



Intermediate-Crimp



Flat-Top

"The Perfect"

Wire Cloths and Screens

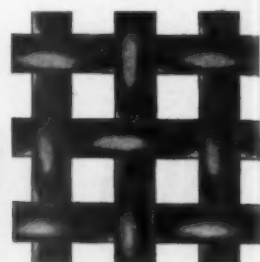
We have been specialists for many years in the making of precision wire cloths, wire screens and woven wire products.

We apply our same precision principles in fabricating wire cloths into finished industrial units, for production or processing equipments or for permanent parts of countless industrial products.

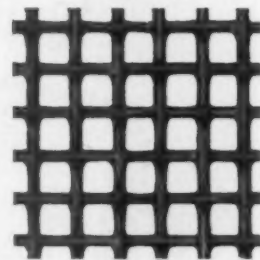
We invite your inquiries for wire cloths of all commercial metals or alloys or weaves, in continuous lengths or cut to size, or processed to meet your individual requirements.

"Perfect" alloys and metals	"Perfect" Wire Cloth WEAVES	"Perfect" Wire Cloth processing	"Perfect" Wire Cloth products
Super-Loy	Arch-Crimp	Bending	Baskets
Steel	Coiled	Binding	Circles
Galvanized	Double-Crimp	Brazing	Cones
Tinned	Double-Fill	Calendering	Crates
Stainless Steel	Dutch	Clinching	Cylinders
Nickel-Chromium Alloys	Filter	Cutting	Discs
Aluminum	Flat-Top	Dipping	Forms
Brass	Herringbone-Twill	Dishing	Leaves
Bronze	Intermediate-Crimp	Flanging	Lengths
Commercial Phosphor	Rek-Tang	Flattening	Panels
Copper	Selva-Edge	Forming	Pieces
Monel Metal	Straight-Warp	Framing	Racks
Nickel	Stranded	Galvanizing	Ribbons
Any special alloys available in rod or wire form	Sta-Tru	Painting	Rolls
	Triple-Warp	Shearing	Sections
	Twilled	Slitting	Segments
	Twisted-Fill	Trimming	Spacers
	Twisted-Warp	Arc-Welding	Strips
		Gas-Welding	Template shapes
		Spot-Welding	Trays

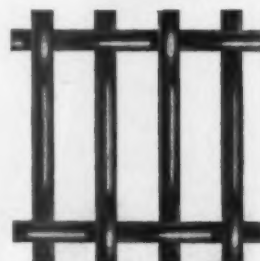
We will follow your specifications and blue-prints exactly as your production engineers have prepared them—or we will submit suggestions for your approval.



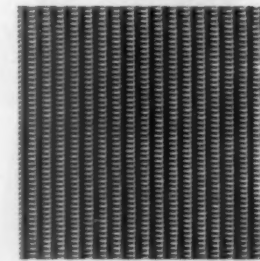
Double-Crimp



Galvanized



Rek-Tang

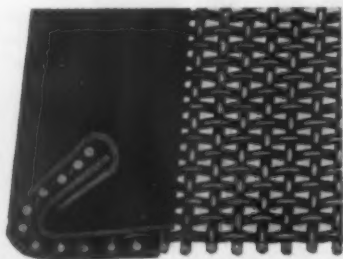


Dutch Weave

The LUDLOW-SAYLOR WIRE COMPANY

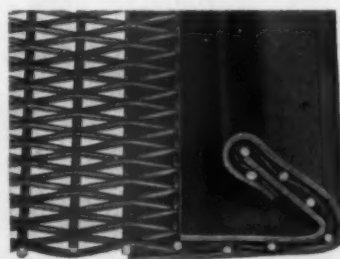
Newstead Avenue & Wabash Railroad

ST. LOUIS 10, MO.



LUDLOW-SAYLOR PRECISION FABRICATING makes vibrating-screen decks and jackets that are easily handled—quickly installed—need fewer adjustments and renewals.

Illustrations suggest only a few of the many available types of wire cloth and woven wire screens, which may be custom-finished with attachments to fit your particular processing installations.





Experience

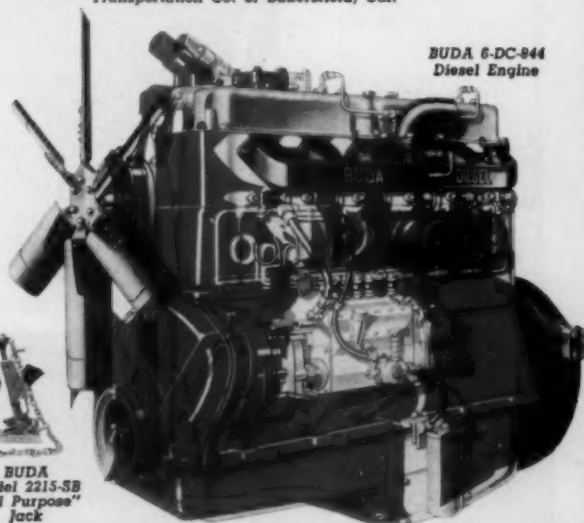
**... pacing the
Progress of Power**

BUDA engines have a habit of keeping step with new power requirements. 64 years of manufacturing experience and 35 years in the engine business provide the background for this accepted fact. BUDA dependability and economy are also recognized by enthusiastic owners. Investigate now.

Write or wire today for illustrated literature.

BUDA Diesel powered Highway Tractor with double bottom tank trailers hauling gasoline for Empire Transportation Co. of Bakersfield, Cal.

BUDA 6-DC-844
Diesel Engine



BUDA
Fossil
Tester

15428 Commercial Ave.
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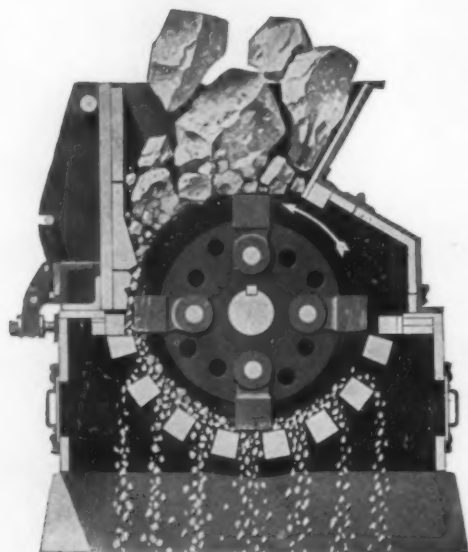


BUDA
Model 2215-SB
"All Purpose"
Jack

INCREASE CRUSHED STONE PRODUCTION WITH

1945

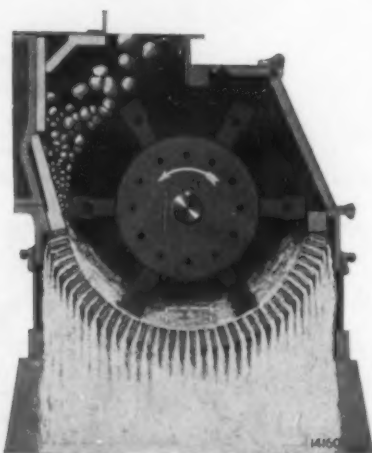
JEFFREY
CRUSHERS AND PULVERIZERS



Jeffrey
Miracle Hammer
Crushers for
Primary Service

Jeffrey is in a position to furnish you with a complete line of impact primary crushers and secondary pulverizers.

Our trained staff of reduction engineers and metallurgists insure the proper application and the best abrasive-resistant metals — for increased production and economical operation.



Jeffrey Swing
Hammer Pulverizers
for
Fine Grinding

Automatically - controlled vibrating feeders can be furnished to provide uniform, maximum feed, which in many cases increase capacities up to 20%.

Investigate.



THE JEFFREY MANUFACTURING COMPANY

Established in 1877

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Detroit 13
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Huntington 19
Milwaukee 11
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St. Louis 3
Salt Lake City 1
Scranton 3

STURTEVANT

AIR SEPARATORS

AN ASSET IN ANY GRINDING DEPARTMENT

FOR EXAMPLE

IN SILICA - - A Silica producer wrote us, "The cost of relining a Tube Mill and equipping it with grinding pebbles is no small item, so anything that would increase the life of the lining and pebbles, and at the same time give the usual mill tonnage or more, was highly desirable. A finer and closer graded product was essential.

"These desirable added features were secured by installing a 14' Sturtevant Separator.

"It was found that capacity of the mills was practically doubled, and owing to the greater load in the mills the life of the liners increased greatly.

"The Sturtevant also delivers a more uniform product and permits quick changes in fineness of the recovered material."

Hundreds of users have thus increased plant operating efficiency with Sturtevant Air Separators. Some of the reasons for the remarkable results achieved are in these STURTEVANT features: (1) Range of fineness from 40 to 350 mesh, (2) Capacities of $\frac{1}{4}$ to 50 tph, while increasing mill capacity as much as 300%, (3) Controlled specific surface area, and (4) Lowered mill and product temperatures.

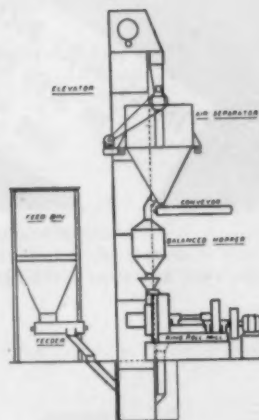
**STURTEVANT
MILL COMPANY**

HARRISON SQUARE
BOSTON 22, MASS.



STURTEVANT COMPLETELY INTEGRATED CLOSED-CIRCUIT GRINDING SYSTEMS

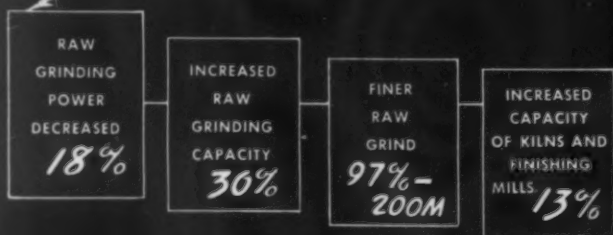
Diagrammed here is the combination Sturtevant Ring-Roll Mill and Air Separator in closed-circuit. The Ring-Roll Mill efficiently crushes either hard or soft materials for medium or fine reductions (10 to 200 mesh). It is easily adjustable to work at maximum efficiency with the Air Separator for desired classification.



AIR SEPARATORS • RING-ROLL MILLS • JAW CRUSHERS • CRUSHING ROLLS • SWING-SLEDGE MILLS • MOTO-VIBRO SCREENS • ROTARY FINE CRUSHERS

FLOW SHEET OF YOUR INVESTMENT IN

DORR CEMENT GRINDING EQUIPMENT



INVESTMENT RECLAIMED
IN LESS THAN
ONE YEAR

When modernizing with the Dorr System—(1) two-stage, closed-circuit grinding, (2) slurry thickening and (3) slurry correction—increased raw grinding capacity is secured without adding more grinding mills. Finer raw grind is obtained, which means not only a better final cement, low in free CaO, but an increase in the capacity of kilns and finishing mills. This added capacity, plus reductions in power and other costs, are estimated to repay the cost of improvements in less than one year. Data shown are based on a Dorr installation of a well-known cement products manufacturer, name on request.

Whether planning a new mill or considering converting your present cement plant to more efficient, more economical operating methods, Dorr Engineers will be glad to consult with you.

DORR

—RESEARCH—ENGINEERING—EQUIPMENT—

ADDRESS ALL INQUIRIES TO OUR NEAREST OFFICE



7517

THE DORR COMPANY, ENGINEERS

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SUGAR PROCESSING

PETREE & DORR DIVISION
570 LEXINGTON AVE., NEW YORK 22

What's this 1945 JAEGER got that no truck mixer ever had?



Built today in
2, 3, 4½ cu. yd.
"Hi-Dump" models.
These same
improvements
also
available in
"Low-Charge" types
up to 5½ cu. yd.

1 **Faster Charging and Discharging to Speed Payload Trips:** Completely unimpeded 2-way flow of material thru enlarged drum opening and steep-angle hopper always sealed to drum, with "single turn" gate control that opens for the quickest discharge of any mixer on the market.

2 **Simultaneous High Pressure Water Distribution:** "Sypho-metered" water, controlled from ground or platform, is sprayed in two directions under positive pressure . . . Quickest uniform distribution, all-weather operation; can wash down chute as well as drum. Awkward overhead tanks eliminated.

3 **Positively Aligned Center Transmission and Drive:** 2-speed transmission and front drum support bearing are one unit with internal drum gear driven on center line, insuring positive and permanent gear alignment.

4 **Streamlined Over-All Housing:** More protection and "eye appeal" plus easier access to open type engine and one-minute-adjustable outside reversing clutch. (Truck engine drive if desired.)

5 **Slump Meter, quick replaceable hopper seal ring (without removing hopper), improved drum roller assembly and many other features, added to the famous, exclusive Jaeger "Dual Mix" Action with Throw-Back Reversing Blades.**

Ask your Jaeger distributor or write for Catalog TM-5 which gives complete details.

THE JAEGER MACHINE COMPANY
603 DUBLIN AVENUE, COLUMBUS 16, OHIO



CENTRIFUGAL PUMPS



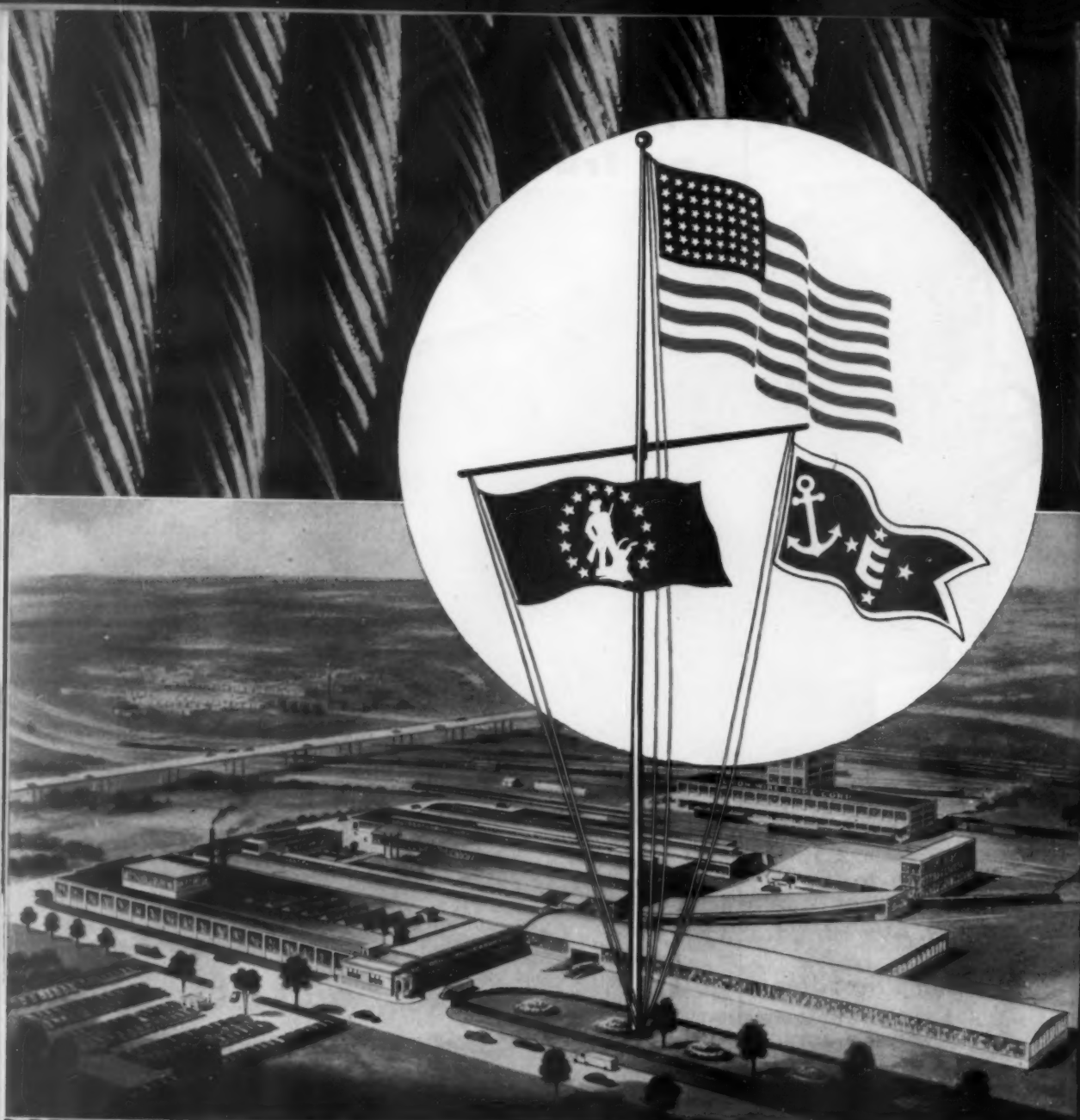
AIR COMPRESSORS



HOISTS



LOADERS



★★★★
FOUR STAR PERFORMANCE
is a peacetime MUST with Union Wire Rope

In the battle to keep Old Glory flying, the Union Wire Rope organization is proud of winning the Minute Man flag and the Navy E Burgee with four stars signifying the limit of renewals for maintained excellence in war production. With war-sharpened skill our organiza-

tion is determined to render four star performance in the service of private industry postwar. In the meantime, our current advertising funds are devoted to furtherance of sound plans offering full opportunity for competitive private enterprise to survive and expand on a sound foundation.

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Kansas City 3, Mo.
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 New Orleans 16
 Atlanta 1



...ABOUT FACE!

About faced, the forces that generated the world's miracle of production can rebuild the economy, make jobs, combat inflation and postwar slump. To do this, however, private industry must have freedom of enterprise stimulated by fair and honest competition. To have this, private industry must see to it that sound plans are first made, then carried out without becoming hamstrung.

For example, legislation for a highway program has been passed by Congress. It calls for a great highway system to be built by efficient contract competition. Most states are far from ready to meet its requirements which call for completed, approved plans before contracts can be let. Definite action is being taken by many responsible officials, but it is a big job and every cooperation should be given them so that time will not be lost because of unprepared plans. Important information on this subject is available in the book "The Road Ahead" published by the American Road Builders' Association, Washington, D. C. It should be read by every person interested in keeping America the land of opportunity. Check the coupon for a copy of this book and send today.

Another project vital to the national economy is developing. The Civil Aeronautics Administration report to Congress included a plan for national airport development. "Put Your Town on the Air Map" is the title of a book published by Personal Aircraft Council of the Aeronautical Chamber of Commerce of America, Inc., Washington, D. C. Send coupon below for this book.

UNION WIRE ROPE CORPORATION, 2156 Manchester Ave., Kansas City 3, Mo.

☐ Send a Free copy of book entitled "The Road Ahead"

☐ Send a Free copy of book entitled "Put Your Town on the Air Map"

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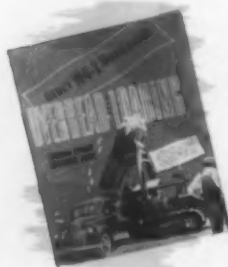
B-45

WHICH OF THESE MATERIALS DO YOU LOAD?

IF you load any of these materials — GRAVEL
EARTH • CRUSHED ROCK • SAND • ORE
SNOW • COAL—look into the many merits of
Athey MobiLoaders.

These fast-working loading tools, mounted on
"Caterpillar" Diesel Tractors, are turning in
outstanding records of production and low
costs. Using the overhead loading principle,
they're moving all kinds of materials faster,
boosting output on every loading job.

Ask your Athey "Caterpillar" Dealer about
delivery on an Athey MobiLoader. In the
meantime, write for new descriptive folders.



New, Picture Folders On Athey MobiLoaders

Write Athey Truss Wheel
Company, 5631 West 65th
Street, Chicago 38, Illinois
for Folders 444 and 445.

Athey

MOBILoadERS



Loading rock into trucks on the Tacoma and Seattle, Washington Airport, this Athey MobiLoader speeds loading jobs for the Northwest Construction Company.



Sub-grading and loading earth at the rate of 90 cubic yards per hour with Athey MobiLoader. Owned by Columbia Bitulithic, Ltd., Vancouver, B. C.



This versatile Athey MobiLoader is loading from a compacted gravel embankment in a county quarry near Paragould, Ark. Loading 4 yd trucks in less than 2 min.



Crushed rock is quickly handled by this big-capacity Athey Model 8 MobiLoader on railroad grade building near Shelton, Washington for General Construction Co.



**"Primacord helps us
keep our pit safer"**

"Safer safety" is an ultimate goal, to be achieved only by combining the right material, the right man, and the right method. Here is the Primacord deal:

Primacord offers *safer storage*, because sparks, friction or ordinary shock do not affect it.

Primacord offers *safer distribution*, because Primacord must be detonated. Common laborers can carry it without danger to the point of use.

Primacord offers *safer loading*, because no cap goes into the hole. Simply lace and lower the bottom cartridge, complete the load, stem and tamp.

Primacord offers *safer firing*, because you attach the detonating cap or caps to the main trunk line when all is in readiness to fire the blast.

Primacord offers *safer digging*, because every cartridge when properly placed is detonated by Primacord. No unexploded powder is left in the rock pile.

THE ENSIGN-BICKFORD COMPANY • Simsbury, Connecticut

P-3



Four aces that win the hand for Primacord Detonating Fuse with a high card to spare.

Also
**ENSIGN-BICKFORD
SAFETY FUSE**
Since 1836

PRIMACORD-BICKFORD

**Detonating
• Fuse •**

Rig Your Hungry Buckets with

Purple Strand **FORM-SET**



THIS diesel-driven fellow isn't much concerned with his table manners. He opens his mouth, gathers in a big load at a single bite, and then expels it many yards distant. But he gets results, and that's what counts with the boss.

These results are affected materially by the wire ropes on boom and bucket. If they're Purple Strand ropes (the finest Bethlehem makes), they're going to give the crane plenty of lifting power, plenty of muscle to heft and swing the tonnage.

And here's a sound tip for men engaged in earth-moving work. On crane, shovel, and dragline jobs, the rope often curves around sharp bends—as, for instance, the sheaves and drums. So the logical choice is Purple Strand Form-Set; that is, Purple Strand that's been preformed.

Preforming takes "wildness" out of wire rope. It relaxes the rope, makes it more pliable. Also longer-lasting; for, with the tension gone, so are many internal stresses that sometimes shorten rope life.

If you want rope that doesn't get tired easily, write Purple Strand Form-Set into your next order. It will pay off in longer service and dollars saved . . . and you'll like the way it handles, too.



When you think WIRE ROPE . . . think BETHLEHEM

CROSS OVER



TO THE PROFIT SIDE of LIME PRODUCTION

• Profitable lime production's worst enemies are obsolete equipment and equipment designed on obsolete manufacturing principles. Described here are three systems that bring lime manufacture up to the level of other advanced manufacturing processes. Their merits have been proved by experience in meeting heavy wartime demands for lime products. In redesigning and modernizing your lime manufacturing methods you should give each your fullest consideration.

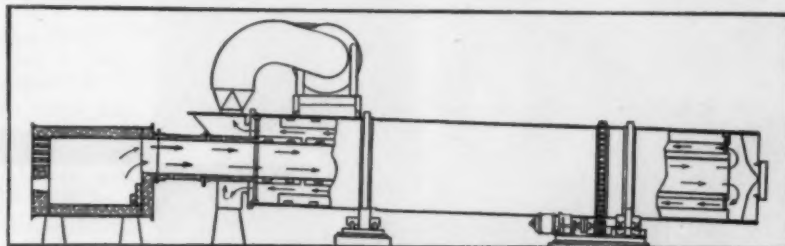
LIME HYDRATE PLANTS—



Stop that loss... Save lime fines

YORK DOUBLE SHELL DRYER

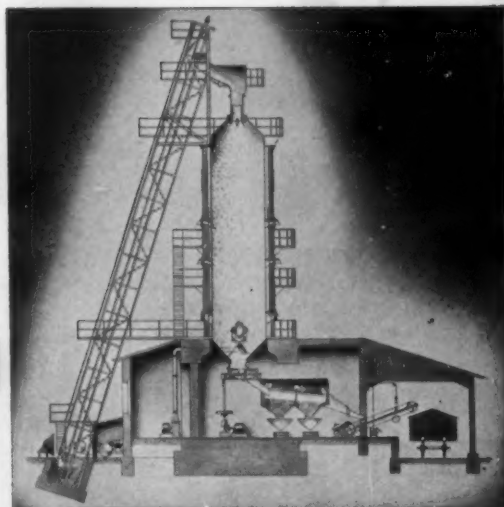
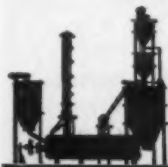
High thermal efficiency and the resulting economy of operation of the York Dryer is unsurpassed. Double shell allows hot gases to dry and pre-heat the stone by radiation. Gases absorb moisture in inner flue, completing the drying process. Result: high fuel efficiency with resultant fuel economy.



OTHER LIME & HYDRATE PRODUCTS—LIME PLANTS COMPLETE • HYDRATORS • SHAFT
KILNS • ROTARY KILNS • DRYING MACHINERY

McGANN PRODUCTS—TANKS • BINS • GREY IRON CASTINGS • SUGAR MACHINERY
ELECTRIC & STEAM WINCHES • SPECIAL MACHINERY FROM ENGINEER'S DESIGNS

LIME & HYDRATE PLANTS CO.

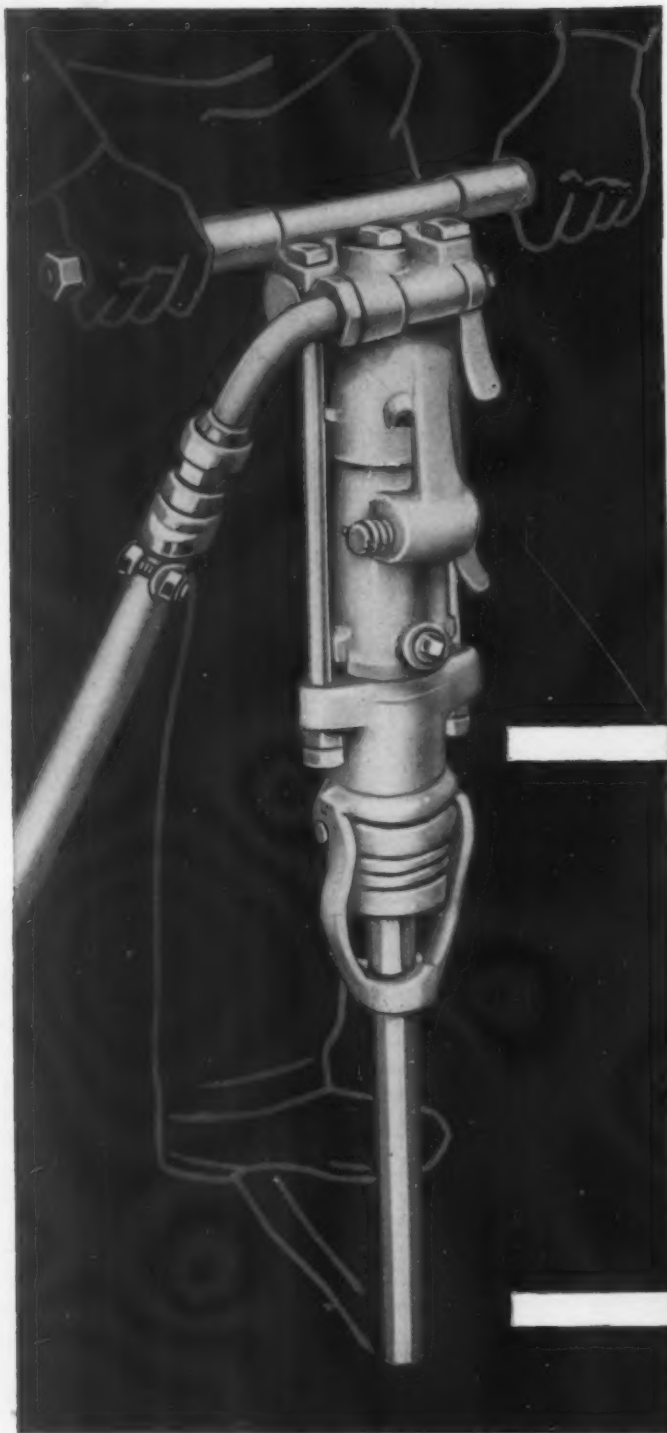


YORK-KUNTZ AUTOMATIC VERTICAL LIME KILN

An automatic kiln that eliminates crushing and assures continuous control. Result: A uniform burn that reaches the absolute peak of fuel efficiency. Features: Either mixed feed, coal or gas firing continuous discharge and continuous feed; adjustable distribution; center load support; center combustion control.

KUNTZ GRAVITY SYSTEM OF LIME HYDRATION

Provides absolute control of the hydration process in a single unit. Saves up to \$1.50 per ton because patented dust control stops all loss of lime fines. Heat of hydration, often wasted, is used to heat water applied to hydrator. The only automatic system of one-man operation giving 100% control of quality and uniformity. Batch or continuous method. Can be applied to any type of hydrate plant.



Watch it

SET THE PACE FOR ITS CLASS

THE fast-drilling, 56-pound CP-42 Sinker features a sturdy, trouble-free, single retainer spring encircling the front end — lengthening service life and lowering maintenance cost. Ideal for general excavation, shaft sinking, road work and quarry drilling. Economical in air consumption. Powerful air blow keeps even the deepest holes free from cuttings. Prove the pace-setting advantages of the CP-42 Sinker Drill under your own operating conditions. Arrange for a demonstration.

There's a CP Sinker for every purpose, from the 28-pound CP-22 to the 119-pound, heavy duty CP-60. All are convertible to wet machines.

★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

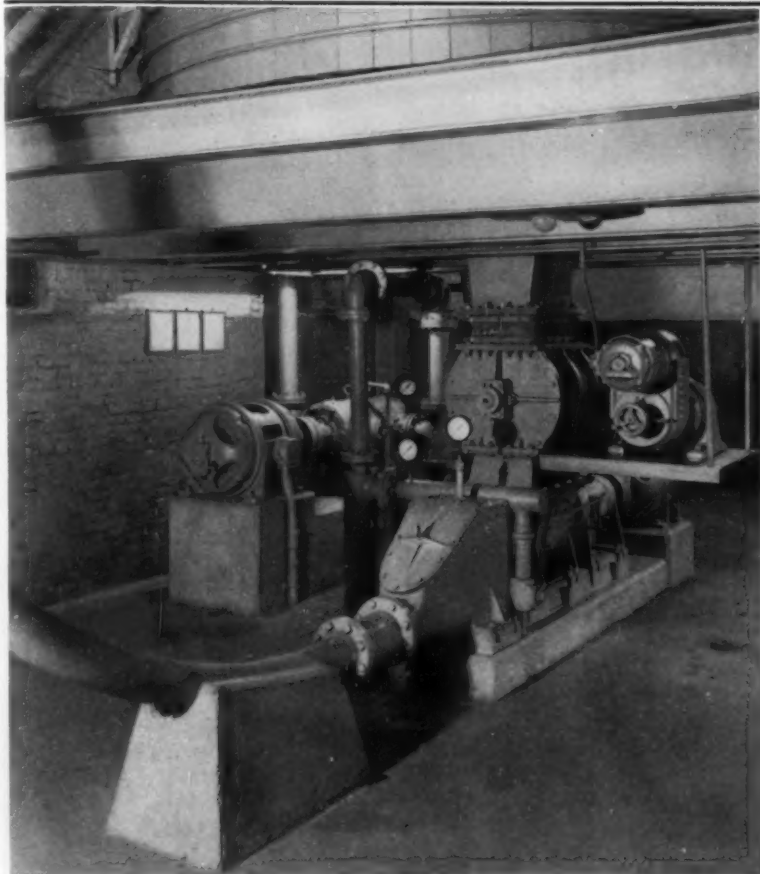
CHICAGO PNEUMATIC
TOOL  COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

Conveying Pulverized Phosphate Rock

WITH A
FULLER-KINYON
PUMP
AND
FULLER ROTARY
COMPRESSOR



One of the leading producers in the East has recently installed a Fuller-Kinyon Conveying System for transporting pulverized phosphate rock from a pulverizer to mixer bin, illustrated in the photograph above.

The pulverized phosphate rock is delivered from a bin, by controlled feed through a Fuller Rotary Feeder, to the Fuller-Kinyon Pump which conveys this material approximately 150 feet to the mixer bin. Rate

of conveying 10 to 25 tons per hour.

An interesting and important feature in connection with this installation is the use of a Fuller Rotary Single-stage Compressor, direct connected to the pump, which furnishes air for conveying at the rate of 406 c.f.m. at 15-lb. pressure . . . air where and when needed and at pressures to do the work most economically and efficiently.

FULLER COMPANY, CATASAUQUA, PA.

Chicago 3 : 1144 Marquette Bldg.
San Francisco 4 : 421 Chancery Bldg.
Washington 5, D. C. : 618 Colorado Bldg.



FULLER-KINYON, FULLER-FLUXO AND THE AIRVEYOR CONVEYING SYSTEMS
... ROTARY FEEDERS AND DISCHARGE GATES ... ROTARY AIR COMPRESSORS
AND VACUUM PUMPS ... AIR-QUENCHING INCLINED-GRATE COOLERS ... DRY
PULVERIZED-MATERIAL COOLER ... AERATION UNITS ... MATERIAL-LEVEL
INDICATORS ... MOTION SAFETY SWITCH ... SLURRY VALVES ... SAMPLERS

P-71

**COYOTE
TUNNEL SHOOTING**
safer...quicker...easier
with
"NITRAMON" C



*"Nitramon" C
should always be
detonated by a
combination of
"Nitramon"
Primer and
"Primacord."*

Here is the ideal blasting agent for use in coyote tunnels. "Nitramon" C is the safest known blasting agent today. Tests and years of actual use have proved it. You cannot detonate it by rough handling, falling rocks, drill steel, tools, flame, friction or ordinary commercial blasting caps. Yet you can fire it readily with "Nitramon" Primer, itself relatively insensitive.

But that isn't all. With "Nitramon" C you can safely install electric lighting, thus making loading easier and faster and, at the same time, helping to reduce accidents.

"Nitramon" C comes in water-tight containers, in a 7 x 24" size convenient for handling and stacking. In addition, it is non-headache-producing.

There is a definite trend toward wider and wider use of "Nitramon" C for coyote tunnel shooting today. It's a favorite with many quarry operators. Why not use it on *your* next blast? E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Delaware.

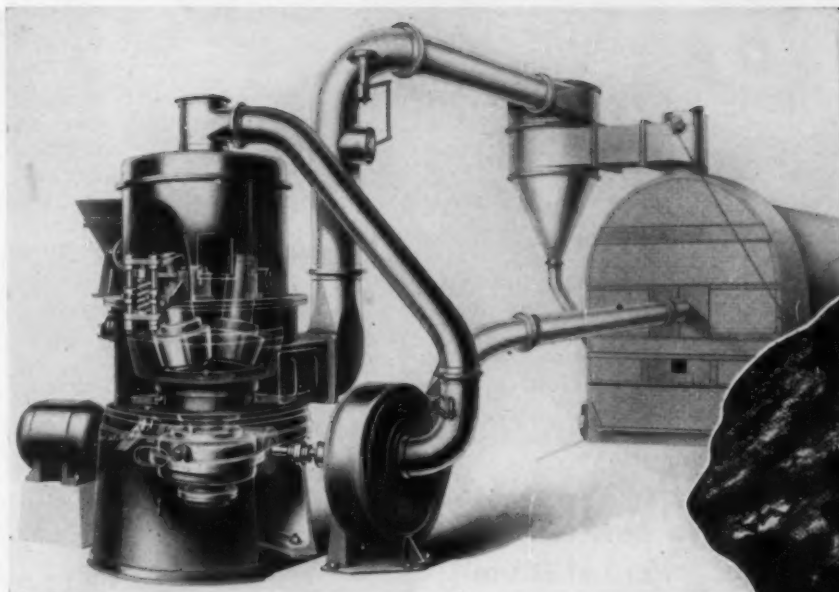
THE MIGHTY SEVENTH WAR LOAN IS ON...BUY BIGGER BONDS



DU PONT "NITRAMON" C
THE SAFEST BLASTING AGENT

RAYMOND

BOWL MILL



Bowl Mill Firing

puts you in line for new economies

The many plants, which have helped to conserve fuel oil and natural gas by substituting powdered coal with Bowl Mill direct-firing, have discovered that this modern method offers new savings in the operation of rotary kilns and industrial furnaces.

It handles any grade or moisture coal . . . operates continuously, month after month, without shutdowns . . . maintains uniform grind at all rates of feed . . . permits easy regulation for fineness or roller adjustment while running . . . is automatic, dustless and quiet.

With the panel board control, very little attention is required by the operator, and one man easily can take care of a battery of Bowl Mills.

For direct-firing cement, lime, dolomite kilns and industrial furnaces, Raymond Bowl Mills will pay back their investment in extra economies. Write for Catalog No. 43.



Bowl Mill Advantages

**High Availability
Low Maintenance
Power Economies
Thermostatic Control
Tramp Iron Disposal
Wide Range Capacity**



For further data on the
BOWL MILL, write for
Catalog No. 43.

RAYMOND PULVERIZER DIVISION COMBUSTION ENGINEERING COMPANY, INC.

1307 North Branch Street, Chicago 22, Illinois

Sales Offices in Principal Cities

Canada:—Combustion Engineering Corp., Ltd., Montreal

Gravity Flow Charging



No Drum Obstructions! No Bottleneck! Materials Speed to Opposite End of Drum

Smith-Mobile's big, roomy feed chute and patented drum construction speeds up truck-mixer charging. The aggregates drop vertically into the chute and continue at high velocity through the charging cone (an exclusive and patented Smith feature) toward the opposite end of the drum. *Gravity does the job!* The action of the mixing blades merely accelerates the flow of the materials. There are no shafts or rods to clog up the feed chute. Smith-Mobile is by far the fastest charging truck mixer on the market.



Merely drive your Smith-Mobile into the batching plant with drum rotating in mixing position . . . receive the materials . . . and drive right out again. There's no charging "bottleneck", and mixing starts the instant the materials enter the drum. You'll find Smith-Mobile faster all the way . . . in charging, mixing, discharging. Get the complete Smith-Mobile story. Ask for Cat. 198-C.

The T. L. SMITH COMPANY
2885 N. 32nd St., Milwaukee 10, Wis., U. S. A.



**Oldest Iron Mine
in the Country uses**

MANHATTAN CONVEYOR BELTS

For more than 200 years, the Mt. Hope Mine at Wharton, N. J., oldest in the country and a supplier of ore for George Washington's armies, with perhaps the deepest perpendicular iron mine shaft in the world, has been producing high-grade magnetite ore.

Today the mine has been mechanized, a new and modern preparation plant has been erected with over 4,000 feet of MANHATTAN Conveyor Belt installed throughout to help in an annual production now estimated at 400,000 tons.

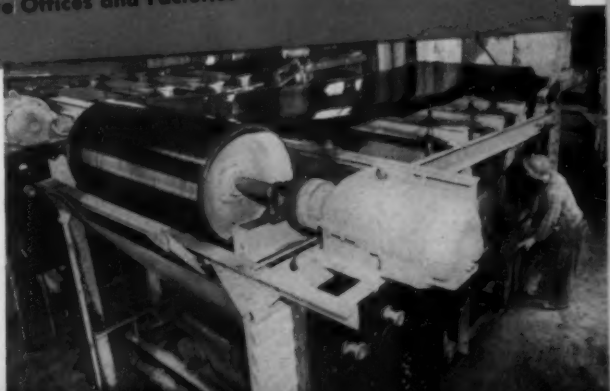
Every belt was engineered by MANHATTAN with correct weight of duck, number of plies and thickness of cover used to give the longest life and to deliver the greatest tonnage. In addition, every belt was made endless on the job by experienced MANHATTAN belt men.

Below—Skip Hoist with RAYBESTOS-MANHATTAN Brake Blocks as original equipment.

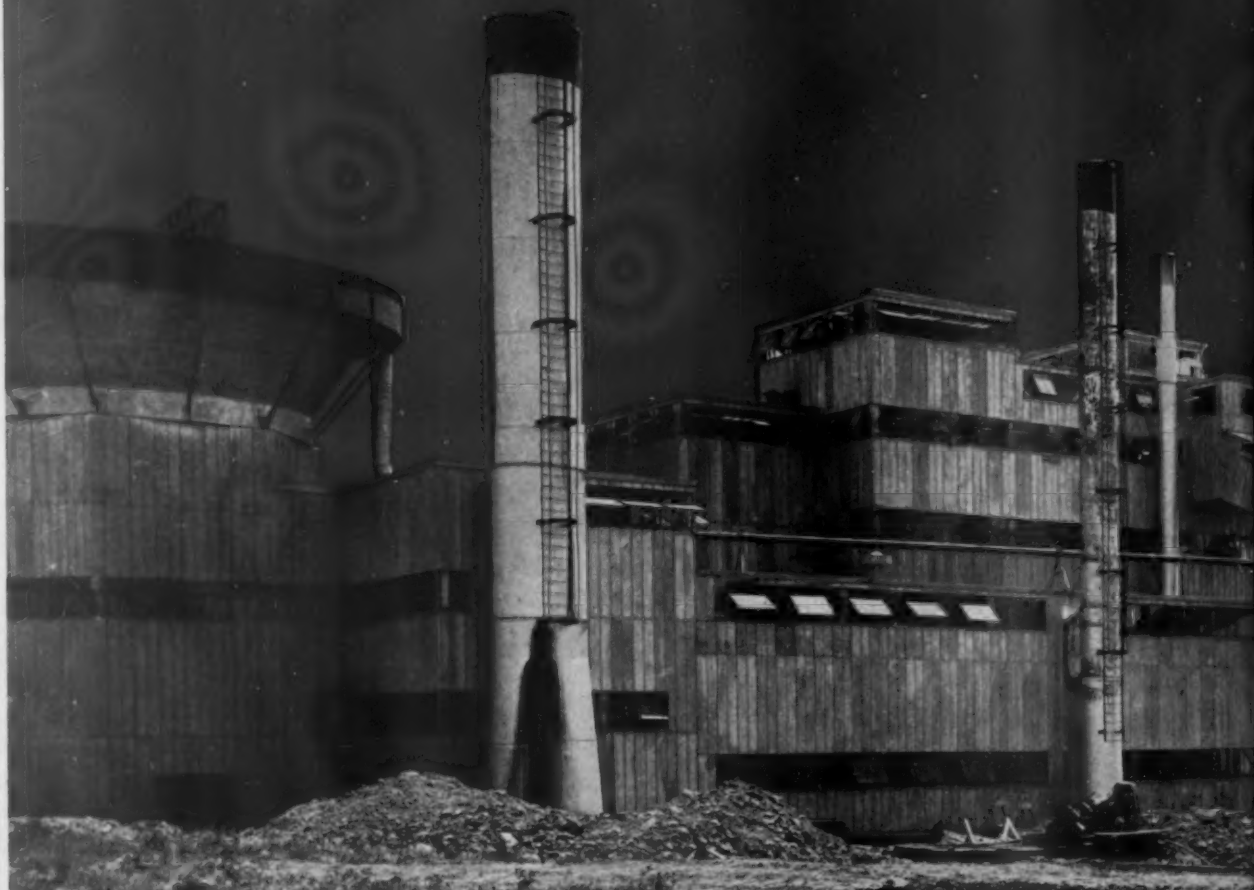
Right—MANHATTAN BELTS on Davenport-type wet magnetic separators.



THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
Executive Offices and Factories **PASSAIC, NEW JERSEY**



RECORD



Main slope conveyor carries run-of-mine coal from underground hopper to top of preparation plant. Capacity 1,000 TPH. Belt is U.S. Matchless grade, 54 in. wide, 7-ply, 42-oz. duck; covers: top, 1/4 in., bottom, 1/16 in.



BREAKER

BUILT BY COORDINATED ENGINEERING

Here is another example of engineering teamwork in planning and building an efficient conveyor belt system.

Shown here is one of the two strip mines which established records for coal output for 1944 in their area—a record which has been continuously maintained.

In both cases United States Rubber Company technicians, team-working with the engineers at the mine and the designers of mechanical equipment, produced the belts capable of handling this enormous volume on a profitable basis.

UNITED STATES RUBBER COMPANY

1230 Sixth Avenue • Rockefeller Center • New York 20, N. Y. • In Canada: Dominion Rubber Company, Ltd.



WIRE ROPE SLINGS NOW Registered FOR KNOWN STRENGTH

● A new wire rope sling service that offers these outstanding features: 1. Every **ACCO** "Registered" Wire Rope Sling is proof tested to twice the rated capacity. 2. Certificate of test and registry showing actual proof test load and rated strength is furnished. 3. Each sling identified with metal registry tag. 4. Made only from Preformed Wire Rope of Improved Plow Steel Grade.

ACCO "Registered" Service helps you select the right wire rope sling for your particular job—then registers and identifies it for known strength.



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ACCO "Registered" Wire Rope Slings
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AMERICAN CHAIN & CABLE**

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ROCK PRODUCTS

A CASE IN POINT—ON PRICE CEILINGS

FREEZING of prices at maximum levels charged during March, 1942, continues a serious handicap to profitable operation of many rock products enterprises. The very nature of the rock products industries poses some out of the ordinary factors that enter into the cost structure, which warrant special consideration.

While price relief has been granted members of the industry in certain areas, where local conditions and the variables peculiar to this class of industry have justified an increase to the satisfaction of the O.P.A., many applications are denied. We do not advocate the blanket discontinuance of price ceilings nor do we imply that the country should do without them or certain other controls in time of war. However, the application for exemption of the sand and gravel industry filed with the O.P.A. by the National Sand and Gravel Association, requesting the removal of the industry's products from the list of price-controlled commodities, has merit. Intense competition between companies for what little construction business there is certainly should protect purchasers from unreasonable prices.

A Plant Shuts Down

The first case of its kind has come to our attention, wherein a sand and gravel producer has actually ceased operations for failure, or delay, in securing price relief on its application claiming that profitable operation was impossible under the March, 1942, price ceilings. This concern, the Decatur Hydraulic Sand and Gravel Co., Decatur, Ill., had had a ceiling price of \$1.25 per cu. yd. established for washed, mixed sand and gravel for concrete.

Along with increased rates of pay for labor and other higher production costs, some of the unpredictable factors peculiar to the industry entered the picture, and prices were increased to \$1.65 in 1943 and to \$1.75 in 1944. Legally, the company had stepped out of bounds in the eyes of the O.P.A. and penalties totalling approximately \$3000 were assessed for overcharges. When ordered to comply with the \$1.25 top price, after paying the fine, plant operations were stopped. It is understood that purchasers now must pay in excess of \$3.00 per cu. yd. for comparable materials delivered from more distant sources and that the company intends to keep its doors closed pending approval of the \$1.75 per cu. yd. rate.

The wage rate, we are told, had increased about 100 percent when all of a sudden Decatur blossomed into a war industry center. An increase of 100 percent in labor cost is a significant cost item when it is realized that for the commercial sand and gravel industry as a whole the payment of wages actually represents

approximately 45 percent of the principal production expense.

It is the legal purpose of the O.P.A. to allow prices high enough to maintain earnings, before taxes, for an industry at least equal to earnings in normal peacetime periods, but this theory can only work if there is cost absorption so that unit costs do not go up even though certain cost items do. Those branches of the industry serving the construction industry almost exclusively, aggregates and cement, must try to spread costs over a far below normal volume of business.

Depletion a Factor

Rock products industries are highly seasonal in character while most other industry is not. Furthermore, depletion of raw materials, the stock in trade of the industry, often must be reckoned in terms of comparatively few years. Sometimes one or two sizeable tonnage orders will deplete a deposit insofar as usable, merchantable materials are available, and we know of big operations that have run out of materials as a direct result of war production schedules.

Depletion as such is, or should be, considered in the establishment of a price structure but, even assuming that it is, variables attendant to actual depletion of raw materials, unforeseen back in 1942, deserve recognition. In thinly-bedded or spotty deposits or where unforeseen changes in physical or chemical characteristics have occurred, lengthened or new methods of haulage have been or will have to be adopted. At Decatur, a 10-in. booster pump, with a 250-hp. electric motor drive and appurtenances, had to be placed into service. Purchased electric power represents nine percent of the total principal operating expenses in the production of sand and gravel for the industry.

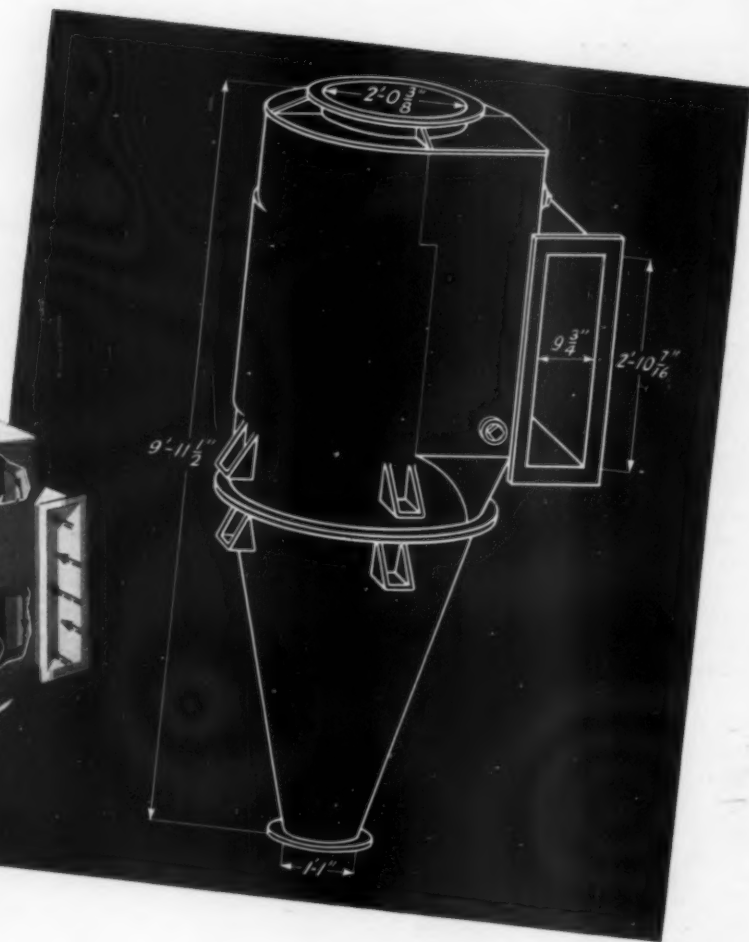
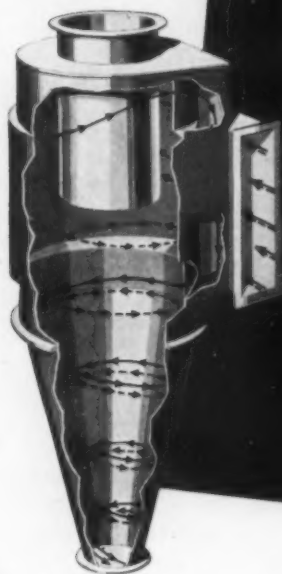
Furthermore, we are told that the percent of oversize in the pit had increased, necessitating an additional man as a rock catcher. It follows that more crushing of oversize was required, with greater delays and resultant higher operating costs.

The facts in this case, as we know them, serve to emphasize some of the basic differences, as regards costs, between the aggregates industries and the run of manufacturing industries.

This company evidently single-handedly is attempting to secure price relief. Assuming that normal business conditions exist in a locality, with fair competitive prices in effect, it likely would have been more effective to file application on a regional basis.

Bror Nordberg

The SHAVE- OFF



Buell's assurance of HIGH EFFICIENCY, LOW MAINTENANCE, LONG LIFE

SUCCESSFULLY utilizing the "double-eddy" current—an aero-dynamic phenomenon present in all cyclone-type collectors (established by van Tongeren)—Buell, and Buell *only*, effectively puts this force to work by an exclusive mechanical feature known as the "Shave-off". By means of this design feature, the important "fines" are collected and by-passed to the lower part of the cyclone where the downward flow of the "double-eddy" current automatically carries them to the dust discharge outlet.

In ordinary cyclones, this dust circulates under the top plate, finally dropping by gravity through the upward, rotating gas stream of the "double-eddy" current. Thus, in its passage to the dust discharge outlet, the "fines" become re-entrained in the gas flow and are partially lost through the gas outlet.

This exclusive feature of the patented Buell (van Tongeren) cyclone is a prime factor in Buell's well-known high recovery efficiency.

Convincing facts about the "Shave-off" may be found in Buell's bulletin—
"The van Tongeren System of Industrial Dust Recovery".

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INNER WELDS GRIND SMOOTH

RESULT IN

HIGH COLLECTION EFFICIENCY
LESS FAN BLADE WEAR
LOW DRAFT LOSS
LOW POWER CONSUMPTION
HIGH TEMPERATURE RESISTANCE
UNLIMITED CAPACITY
NO MOVING PARTS
FREE DUST FLOW

PRODUCE

HIGH EFFICIENCY
LOW MAINTENANCE
LOW OPERATING COST
LONG LIFE
NO CLOGGING

DESIGNED TO DO A JOB, NOT JUST TO MEET A "SPEC"

TRUCK tire shortages are becoming a serious problem, particularly with respect to delivery of agricultural limestone. J. R. Boyd, secretary of the Agricultural Limestone Division, National Crushed Stone Association, in a recent executive letter to the membership, has announced that in response to a request from Howard M. Thomas of Fort Scott, Kans., chairman of the Division, the critical truck tire situation was brought to the attention of Dr. MacLeod, Chief of the Chemicals and Fertilizers Branch, Office of Materials and Facilities, War Food Administration. Dr. MacLeod has advised that a recommendation has been made that a priority rating of "1" be given to agricultural limestone distributors for obtaining tires for the months of April, May and June. Quarry trucks not engaged in distributing agricultural limestone to farmers will not be entitled to this rating.

Industrial Sand Status

In response to a request of Executive Secretary V. P. Ahearn, National Industrial Sand Association, to the War Manpower Commission to clarify the status of the industry, Collis Stocking, chairman, Essential Activities Committee, has advised the War Production Board that the production of foundry sand is included within Group 11, Nonmetallic Mining and Processing and Quarrying, of the W.M.C. list of essential activities, and that the production of industrial silica sand is covered by the designation "abrasive sands" as contained within Group 11. The local draft board, however, has the responsibility of determining the employee's status with respect to the specific establishment and the registrant's employment therein.

Curtailment of Steel Purchases

An order has been issued by the War Production Board pursuant to P-56 which directs the curtailment of steel purchases in the second calendar quarter of 1945 due to an anticipated steel shortage. V. P. Ahearn, executive secretary of the National Sand and Gravel Association advises that producers using the S-7 allotment symbol under P-56 may not place purchase orders for steel in controlled material forms for delivery in the second calendar quarter of 1945 in excess of 80 percent of the steel purchases for M.R.O. purposes during the second calendar quarter of 1944 or the fourth calendar quarter of 1944, whichever is greater. Purchase orders already placed in

excess of this limitation must be cancelled or reduced. Relief procedures are available under the provisions of paragraph (c). The sand and gravel industry M.R.O. quota in 1945 under P-56 was originally 120 percent of total M.R.O. purchases in the corresponding calendar quarter of 1943. The steel curtailment order applies the 80 percent figure to either the second or the fourth calendar quarters of 1944.

Agstone Producers Under Wage-Hour Law

J. R. Boyd, administrative director, National Crushed Stone Association, has advised that producers of agricultural limestone are included among those over whom the federal Wage and Hour law, Section 3(j), has been extended, effective April 15, 1945. A previous interpretation of the Fair Labor Standards Act had held that all crushed stone producers were subject to the law and the recent bulletin amplifies this ruling to also include agricultural limestone producers. The minimum wage is 40c per hour; the overtime provisions are that employees who work more than 40 hours in any one workweek must be paid time and one-half their regular rate of pay. Truck drivers are exempted if they drive across State lines in any workweek, but if truck drivers do not drive across State lines in any workweek, they will henceforth be subject to the Wage-Hour law. The reason for this apparent contradictory interpretation is that truck drivers crossing State lines are covered by the Motor Carrier Act of 1935.

Approve Block Price Increases

Under order No. G-10 under M.P.R. No. 188, Cummer Lime & Manufacturing Co., Jacksonville, Fla., has received authority for the following increase in concrete products prices:

Catalog No.	Size of unit	Type	Increase Per 100
1	8 x 8 x 16	Stretcher and joist	\$2.00
2	8 x 8 x 16	Single and double end	2.00
3	8 x 8 x 16	Steel jamb (all types)	2.00
4	8 x 8 x 8	Half and lintel	1.00
5	4 x 8 x 16	Stretcher	1.00
6	4 x 8 x 16	Single and double end	1.00
7	4 x 8 x 16	Steel jamb (all types)	1.00
8	4 x 8 x 8	Half stretcher and corner	.50
9	4 x 8 x 8	Half jamb	.50
10	4 x 8 x 12	Double end	.75
11	5 x 8 x 12	do	.75
12	8 x 12 x 16	Stretcher	3.00
13	8 x 12 x 16	Single and double end	3.00
14	4 x 4 x 16	Partition	.50
15	8 x 4 x 16	do	1.00
16	8 x 6 x 16	do	1.25
17	do	Brick	\$2.00

¹ Per 1,000.

Motor Vehicle Parts

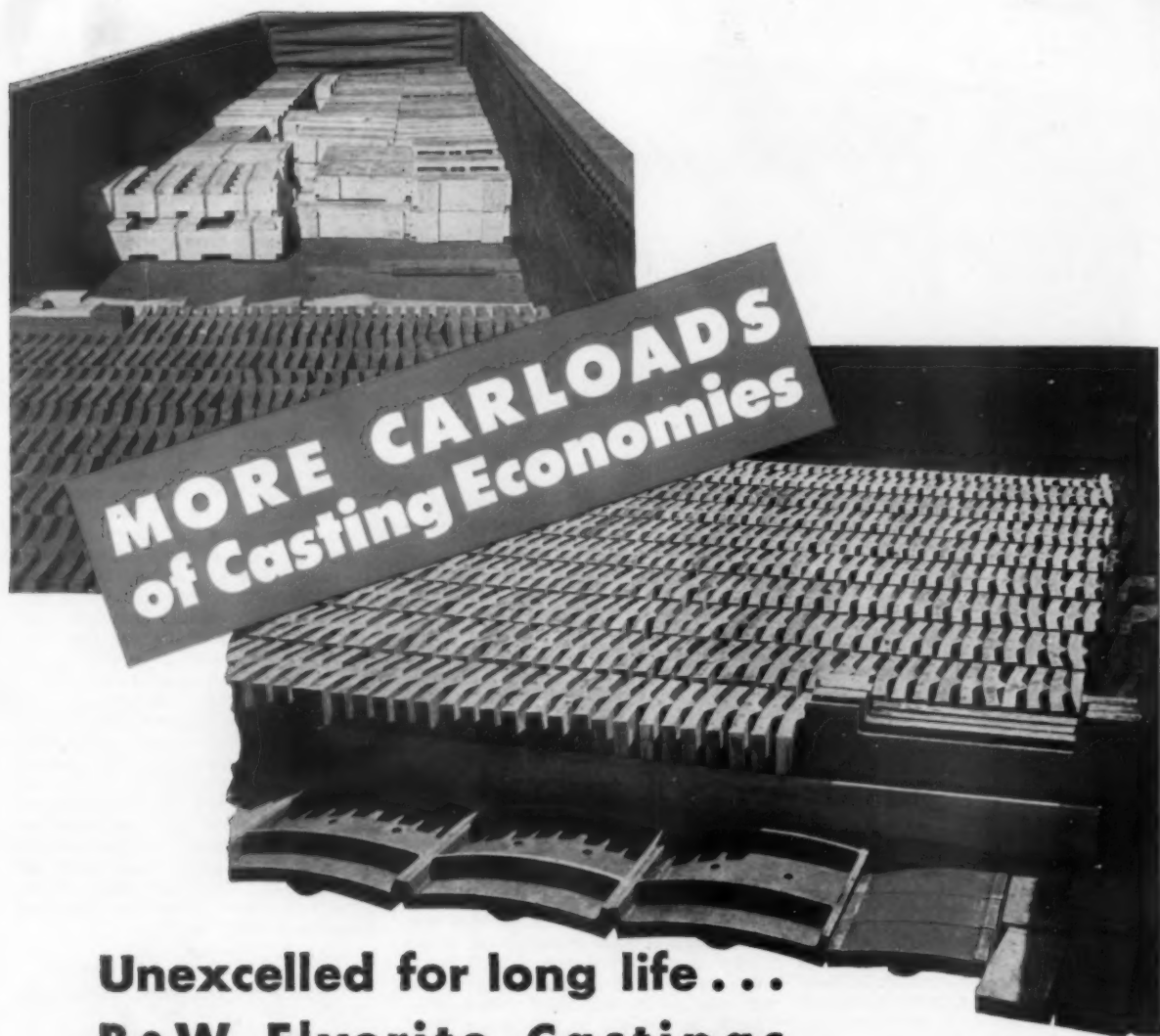
An amendment has been made to L-158 order of the W.P.B. which further restricts sales of motor vehicle repair parts. Under section (n) no new replacement part shall be sold or delivered to a consumer to replace a part which the producer or distributor can rebuild or recondition by use of available local reconditioning facilities. The provisions of this paragraph shall not apply to any replacement parts sold to a consumer where the old part is traded in on a unit exchange basis. However, a used replacement part need not be turned in in the following cases: Where the used part has been consumed in use, lost or stolen; where the used part is a cab assembly; where the consumer is a federal or territorial department, bureau or agency, which is forbidden by law from making such disposal of replacement parts; where the new or rebuilt part is ordered by telephone, telegraph or mail or is to be installed by the purchaser; or where the new part to be purchased by the consumer will improve the efficiency of the vehicle, its capacity or usefulness, such parts being as follows: oil filters, governors, shims, piston and piston ring expanders, and balance weights, etc.

Tire Recapping Emergency

A plan which is being worked out in the Chicago district of the ODT may become general practice throughout the country if it works out successfully. Backed by the entire motor trucking industry of the Chicago district, by motor carriers, by tire re-cappers' groups, the district office of ODT, and the OPA, an emergency plan for the conservation and recapping of heavy duty truck tires, due to a critical shortage, has been initiated. Under the plan adopted, the OPA will ration a certain number of tires from its January and following quotas for use by motor carriers for the exclusive purpose of substituting for running tires, which will be removed and recapped.

Cement-Bonded Building Materials

As the result of research carried on by the Department of Engineering Research of the University of Michigan under contract with the Office of Production Research and Development of the War Production Board, several low cost, cement-bonded lightweight building materials have been developed, according to a recent WPB announcement.



**MORE CARLOADS
of Casting Economies**

Unexcelled for long life . . . B&W Elverite Castings

ELVERITE A—A chilled iron product made from cold-blast charcoal iron. The mixtures are varied to obtain a chilled section of $\frac{1}{8}$ to $2\frac{1}{2}$ inches in depth, depending upon the shape and use of the casting. Elverite A is made with a machinable gray iron back which gives the castings strength and resistance to shock. The chilled sections have a hardness of 500-550 Brinell.

ELVERITE C—An alloyed, heat-treated, chilled iron product made from a base mixture of charcoal iron. The sections back of the chilled areas are of such hardness that they must be finished by grinding. The chilled sections have a hardness of 675-725 Brinell.

For economical operation, specify Elverite.

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The Babcock & Wilcox Co.

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C-41

Rocky's NOTES

More Uses for Geology

THREE RECENT BULLETINS of the Engineering Experiment Station, Purdue University, Reprints Nos. 12, 13 and 14, are of unusual interest to rock products producers. All deal with drainage or lack of drainage of cross-country highways. They apply geology to subgrades of highway pavements to explain the special need for drainage in some situations. They show how soil surveys—and aerial photographs—are used to locate sand and gravel or rock deposits from which materials can be obtained for granular bases under pavements. All are reprints of papers delivered at the November, 1943, annual meeting of the Highway Research Board; the publication date is December, 1944.

Cement manufacturers and aggregates producers have no primary responsibility for the design of highway pavements, but it is important that they know something about good design and faulty design, if for no other reason than to be prepared to defend their materials if results are not satisfactory. Both cement and aggregates have often been blamed for failures caused by lack of drainage of the subgrade, which is a failure of design and not of materials or workmanship.

Subsurface Drainage

Reprint No. 12, entitled "Large-Scale Studies of Highway Subdrainage," by Bram McClelland, is a mathematical analysis designed to help the highway engineer locate tile drains in subgrades, according to local needs. The ideal is to retain just the right amount of moisture in the subgrade to give the particular soil there, its greatest stability. One conclusion is that the most favorable location of longitudinal drains is near the edge of the pavement. The primary interest in this discussion to producers is that not only are granular sub-bases needed in many instances, but many miles of tile drains, which in the majority of cases will probably be made of concrete.

Reprint No. 13, "The Engineering Significance of Soil Patterns," by Donald J. Belcher, is of very real significance to rock products operators because it gives practical information on how to interpret aerial

photographs to identify the soil patterns. In this instance it is done primarily to study soil profiles for design of pavement drainage, but a few paragraphs explain how sand and gravel deposits and rock outcrops or near outcrops can be identified on these aerial photographs. Obviously, if granular subgrade materials are to be supplied by a commercial producer of aggregates he will want to be able to find out if any local deposits exist, their extent; and if he does not want to develop them he will want to know if they are a threat competitively.

Clay, Silt, Sand

The earth covering or soil is ordinarily a very thin layer of decayed or broken-down rock. The surface soil may have no mineralogical relation to the bed rock, or other soil material under it, because it may have been transported by wind or water or ice from far away rock sources. Ordinarily three distinct layers of soil are recognized, known as A, B and C horizons, and cross-sections through them are "soil profiles." The need for special subsurface drainage depends on the character of the soil in the particular horizon on which the pavement rests, or the one immediately below it. A pavement laid on clay in every case needs to be prepared for subdrainage.

What producers of aggregates generally do not know is that clay, silt and sand are defined in a geological or soil sense merely by particle size without relation to mineralogical or chemical composition. Clay soil (geologically a variety of mud) is of particle size less than 0.002 millimeters in diameter (2 microns); silt is material up to 0.2 millimeters in diameter (200 microns or 84-mesh); and sand is material over 0.2 mm. in diameter but less than 2 mm. (2000 microns); over 2 mm. the particles

are gravel. The 2 mm. diameter corresponds to about 0.08 in., or passing an 8-mesh sieve. Another geological distinction is that clay consists of particles so fine that they will stick together in the presence of moisture, while silt particles will not. Most soils consist of mixtures of clay, silt and sometimes sand. Most good agricultural soils are largely clay. So any good agricultural soil, such as our midwest corn belt, is poor material on which to lay a pavement.

Incidentally, a famous lawsuit by a gravel producer against the U. S. government involved the question whether the overburden, stripped and cast away, was silt or clay within the meaning of the contract terms. Clay overburden was to be stripped at government expense, but excess silt, silt being a required constituent of the fine aggregate, was to be wasted at the contractor's expense. So, there may be times when it is important for the producer to know the technical definitions of "silt" and "clay." Obviously silt may form the minus 100-mesh constituent of fine aggregate, but clay may not, although mineralogically the silt and the clay may be much the same.

Pumping Pavements

Reprint No. 14, referred to in the opening paragraph, is "Pumping of Rigid Pavements in Indiana," by K. B. Woods and T. E. Shelburne. There were to have been a moving picture exhibit and a discussion of this subject at the National Sand and Gravel Association convention scheduled for last January. Pumping at the joints occurs under concrete pavements which are laid on a relatively impervious soil subgrade. This condition most frequently is in cuts, with the subgrade in B or C horizons of the soil profile, although where the pavement is laid on a clay top soil, without special subgrade preparation, the same condition exists.

Hence, unless a pavement subgrade is in a naturally granular soil, sand or silt, which is another way of saying it is naturally drained, it is bad highway design not to put in tile drains and a sub-base of not less than 6 in. of sand or similar granular material, to provide subsurface drainage. It doesn't make any difference what the pavement is made of, if the sub-base is faulty. A reinforced-concrete pavement may last longer, but eventually failure will occur from lack of a sustaining foundation. It has taken midwest highway engineers a long time to admit what every early road builder knew.

Nathan C. Rockwood



SMOOTH

*Rope
work*

DIGGING drainage channels on the Desert to protect the Colorado River Aqueduct from the rare—but extremely heavy—desert rains is one of the countless jobs for construction equipment in which smoothly functioning wire rope plays an essential part.

On construction jobs everywhere, smooth wire rope work is essential for efficient, trouble-free operation of draglines, shovels, hoists, etc. Knowing this, experienced contractors always keep wire rope in condition with effective lubrication—*Texaco Crater*.

Texaco Crater penetrates into and preserves the core of wire rope, preventing collapse. It seals each wire in a tough viscous film that reduces internal friction and wear, keeps out moisture, prevents

corrosion. Keeps rope strong longer.

Used on open gears, *Texaco Crater* cushions load shocks, quiets noise, reduces wear. It doesn't channel or throw off, but clings to tooth surfaces, following through from gear to gear, despite high pressures and temperatures, and peripheral speeds.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

- ★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.
- ★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.
- ★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.
- ★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.
- ★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.



TEXACO Lubricants and Fuels

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS

News

ABOUT THE INDUSTRY AND PEOPLE

Silica Corp. Officials

JACOB S. COXEY, JR., has been elected president of the Industrial Silica Corp., Youngstown, Ohio, to succeed the late L. M. Hansen. P. GRANT FORMAN, vice-president and works manager, was named first vice-president in charge of operations, succeeding Mr. Coxey. A. C. LEMKE, treasurer, has been named secretary-treasurer, and CHARLES F. EBERHART has been made assistant secretary. R. S. J. RANEY remains as chairman of the board.

Retires

DAVID P. KEISTER, district sales manager, Huron Portland Cement Co., Grand Rapids, Mich., has retired after 34 years of service with the company. He plans to spend most of his time on his estate near Elk Rapids, Mich. CHARLES DeHOOG will succeed Mr. Keister as district sales manager.

Assumes New Duties

RICHARD F. HOGAN, traffic manager, Warner Co., Philadelphia, Penn., has been named procurement officer in addition to his regular duties, following the resignation of Ed. Henry, who has taken a position with the Haas-Miller Corp., a textile chemical firm in Philadelphia. Mr. Hogan is assuming the additional work as it is expected that much of the work will decline as soon as the war in Europe is ended.

Pioneer Directors

VANCE S. TJSSEM, credit manager and purchasing agent, Pioneer Sand and Gravel Co., Seattle, Wash., has been named vice-president of the company. Mr. Tjsssem and CLAUDE L. GOLDING were also elected to the board of directors. Mr. Golding had been elected vice-president in January.

C. of C. President

ROY E. MAYES, president, Carthage Marble Corp., Carthage, Mo., has been elected president of the Carthage Chamber of Commerce, succeeding Ralph Ford.

W.L.B. Industry Member

VINCENT P. AHEARN, secretary of the National Sand and Gravel Association, Washington, D. C., has been appointed an alternate industry member of the National War Labor Board.

Rock of Ages Directors

W. H. B. PERRY of Waterbury, Vt., has been re-elected a director of the Rock of Ages Corp., Graniteville, Vt. JOSEPH T. SMITH and ROY L. PATRICK, president and treasurer, respectively,

of the Eastern Magnesite Talc Co., were also re-elected directors. ROBERT PATRICK, assistant treasurer of the talc company, was elected a director of the company.

Talks on Postwar Plans

TIP BROWN, district sales manager for the Lehigh Portland Cement Co., Kansas City, Mo., recently spoke before the Lincoln, Nebr., board of realtors on the subject of postwar employment for returning soldiers. Mr. Brown is past chairman of the citizens postwar construction council of Kansas City. His talk pointed out that the immediate objective of postwar planning is to create employment in a hurry and to do the preliminary work now in setting up plans and specifications that will obviate costly delays at a time when millions of Americans will be returning.

Reelected President

WILLIAM J. LYNCH has been re-elected president of Dolese & Shepard Co., Chicago, Ill., at a recent meet-



William J. Lynch

ing of the board of directors. Other officers include: Albert R. Hock, vice-president; William J. Stoffel, treasurer; and A. E. Trimarco, secretary.

Serves in China

FIRST LIEUTENANT CLEM BEALS, II., formerly assistant manager of the Springfield Cement Products Co., Springfield, Ohio, is now serving in the adjutant general's section of a Chinese Combat Command field headquarters in South-Central China. Lt. Beals arrived in China in December, 1943, as purchasing and contracting officer for the American infantry training center at Kweilin. Twice the

advance of the Jap columns caused the Americans to move their base. For his service in the field he is entitled to wear a bronze campaign star on his Asiatic Campaign ribbon. He was commissioned as a second lieutenant in February, 1943, and received his promotion to first lieutenant in February, 1944, shortly after his arrival in the Orient. A brother, Hugh, has recently joined the Merchant Marine.

Heads Purchases

JOHN J. HEFFERNAN, assistant purchasing agent for the Universal Atlas Cement Co. and the Atlas Lumnite Cement Co., New York, N. Y., has been appointed purchasing agent for both companies. He succeeds the late Richard B. Hynes, who died on March 21. Mr. Heffernan joined the Atlas Portland Cement Co., New York, in 1925, where he was employed in the secretary's office. When Atlas and Universal were combined in 1930, he transferred to the Chicago headquarters and subsequently became assistant secretary of both companies. After the removal of the company headquarters to New York, he became secretary and later became assistant purchasing agent of both companies.

Lone Star Appointment

MARK H. SMALL, assistant manager of the Kansas division of the Lone Star Cement Corporation, Kansas City, Mo., has been made vice-president and manager. He succeeds J. A. Lehaney, who is remaining with the corporation in a consulting capacity. Mr. Small started in the cement industry in 1925 with the Portland Cement Association. He became district manager of their Kansas City office in 1933, and later resigned to join the staff of the Lone Star Cement Company in their Kansas division.

Transferred

JOHN P. BURROWS has been transferred from Carlsbad, N. M., to the home office of the International Minerals & Chemical Corp., Chicago, Ill., as assistant general purchasing agent.

Joins Mining Congress

PAUL M. TYLER, regional engineer in charge of the Bureau of Mines' field explorations and laboratory work in the 21 Eastern States, has accepted a temporary appointment with the American Mining Congress.

Gypsum Engineer

MAYNARD H. VAN ORNUM has left the employ of the Bureau of Mines to become mine engineer for the U. S. Gypsum Co., Plasterco, Va.

Asphalt Chairman

H. B. PULLAR of the Berry Asphalt Co., has been elected chairman of the executive committee of The Asphalt Institute, New York, N. Y. BERNARD E. GRAY was reelected general manager and chief engineer, and HERBERT SPENCER was reelected president. GEORGE R. CHRISTIE was reelected secretary-treasurer, with JOHN N. SMITH continuing as assistant treasurer. Five divisional vice-presidents were elected, namely: Ole Berg, Jr., C. E. Cox, F. R. Field, A. M. Maxwell, F. V. Widger, and J. S. Williams. During the year new Institute offices were opened at Billings, Mont., with John R. Banning in charge; at Oklahoma City, with A. J. Kavanaugh in charge, and at Portland, Ore., with W. A. Bugge in charge.

Rejoins Asbestos Co.

Sq./L. GEO. F. JENKINS, for many years associated with Asbestos Corp., Ltd., of Thetford Mines, Canada, has been appointed general superintendent of the company, in charge of mills. (Sq./L. means "Squad Leader" and is a rank in the R.A.F. equivalent to Major in the Army). Mr. Jenkins has been on active service with the R.C.A.F. in Canada and Overseas since July, 1940. While serving overseas he was attached to the R.A.F. and was cited in dispatches for distinguished service. He has now retired (after four and a half years of active duty) and has rejoined the staff of Asbestos Corp., Ltd.

Named Board Member

WILLIAM J. REARDON, head of Reardon Industries, Cincinnati, Ohio, producers of insulation and building chemicals, has been elected to the board of the directors of the New Orleans stockyards.

Member Research Institute

GEORGE W. WARD, supervisor of ceramic industrial materials research, Armour Research Foundation, has been appointed a member of the staff of the Midwest Research Institute, Kansas City, Mo.

Married 50 Years

MR. AND MRS. CHARLES T. ALLEN of Carthage, Mo., recently celebrated their 50th wedding anniversary. Mr. Allen was secretary of the Carthage Crushed Limestone Company until his retirement in 1941. He was connected with the company for 35 years.

A.I.M.M.E. Speaker

DR. CHARLES H. BEHRE, research professor of geology, Columbia University, and chairman, Industrial Minerals Division, A.I.M.M.E., spoke before the Chicago section, A.I.M.M.E., February 7, on the subject "World Peace and the Industrial

Minerals." Much of his talk was concerned with the comparative resources in minerals of the United States with other countries and the significance of the domestic minerals industries in providing employment and prosperity.

Succeeds Husband

MRS. LILLIAN E. SNOUFFER has been elected president of J. & L. Snouffer, Inc., Dublin, Ohio, producers of agricultural limestone, succeeding her late husband, Lawrence L. Snouffer, who died in January. IRVEN J. HORCH, Mr. Snouffer's assistant since 1936, was elected vice-president and general manager. ROBERT L. SNOUFFER, grandson of John Snouffer who established the stone company about 25 years ago, and son of the late owner, was named secretary and assistant manager. The company will continue to specialize in agricultural limestone and crushed limestone.

Heads Concrete Co.

JOHN S. SULLIVAN, formerly associated with the sales department of the Dewey Portland Cement Co., Kansas City, Mo., has been named president of the Ready Mixed Concrete Co., Kansas City, Mo., and Charles I. Campbell, who has resigned as vice-president of the A. O. Thompson Lumber Co., has been made president of the Centropolis Crusher Co., also of Kansas City, Mo., in the reorganization of these companies. Frank L. Carswell becomes vice-president and James E. Burke, secretary-treasurer of both companies.

Association President

JOHN CURTIN, Sr., assistant sales manager at the Bellefonte, Penn., plant of the Warner Company, has been elected president of the Pennsylvania Stone Producers Association. Mr. Curtin, an active member of the Association, is well known in the crushed stone industry.

Bessemer Director

A. E. ADAMS, Jr., Youngstown, Ohio, banker, has been elected a director of The Bessemer Limestone & Cement Co., to succeed Walter E. Meub, who died last year.

New Zealand Visitor

T. H. LAWN, general manager of Booth, MacDonald & Co., Ltd., Christchurch, New Zealand, machinery firm representing Austin-Western and other manufacturers, was a recent visitor in Chicago.

New Association

SAM C. DAVIS, formerly treasurer of The Dayton Builders Supply, Dayton, Ohio, is now associated with Price Brothers Company in Dayton.

Monarch Officials

FRED H. RHODES, president and general manager of the Monarch Cement Co., Humboldt, Kans., has resigned after 32 years of service with the company. He was secretary-treasurer for several years before he became president in 1935. Walter H. Wulf, who has been vice-president for a number of years, will succeed Mr. Rhodes as president. Mr. Wulf is stepping into the position held by his father, H. F. G. Wulf, who was president of the company prior to Mr. Rhodes. Chester A. Brooke, sales manager and vice-president, was elected vice-president to fill the vacancy left by Mr. Wulf. Gerald Calloway was elected secretary-treasurer and Miss A. M. Barrackman was reelected assistant secretary-treasurer. Directors elected for the ensuing year are: Walter H. Wulf, C. A. Brooke, Gerald Calloway, William Fair, Paul Brown, L. H. Heffner, P. R. Fegely, Morris Freshman, P. J. Meehan, H. C. Constant, and Frank N. Wachter. Paul Brown, Morris Freshman and Frank Wachter were elected as an advisory board.

Visits Plant

LIEUT. (J.G.) WILLIAM B. JUDAH, U.S.N.R., formerly associated with the Graystone Concrete Products Co., Seattle, Wash., returned home recently on his first leave in two years. He spent considerable time at the plant and expressed a desire to return to the concrete products industry when the war ends. Lieutenant Judah has been on destroyer duty in the Southwest Pacific theater, and took part in operations at Leyte. He is now on his way to the East Coast for further special training prior to returning to active duty.

Joins Talc Co.

MAX TESSMER, formerly in charge of shaft sinking and underground mining of limestone for the Pittsburgh Plate Glass Co., Barberton, Ohio, has joined the International Talc Co., Inc., Gouverneur, N. Y., as mining engineer.

Resigns

H. S. REICHENBACH, for the past 22 years assistant advertising manager of the Lehigh Portland Cement Company, has resigned to become advertising manager of Traylor Engineering & Manufacturing Co., Allentown, Penn.

Heads A.R.E.A.

A. A. MILLER, chief engineer maintenance-of-way, Missouri Pacific Railroad Co., St. Louis, Mo., has been elected president of the American Railway Engineering Association in the election of officers held early in March.

Lime Directors' Meeting

NATIONAL LIME ASSOCIATION has postponed its annual meeting of the association, but a meeting of the Board of Directors will be held at The Homestead Hotel, Hot Springs, Va., on May 17, 18, and 19. To properly consider the research programs at the Massachusetts Institute of Technology and the National Bureau of Standards, Professors Voss and Staley and Dr. G. J. Fink have been invited to present their reports in person and to take part in the discussion of the present status of this work and plans for the future. Dr. Willem Rudolfs also will discuss with the directors the expanding use of lime for sewage treatment.

Start Agstone Plant

HAYES CONSTRUCTION Co. plans to start production of agricultural limestone and crushed rock at its new quarry west of Junction City, Kans., on May 1, according to W. O. Homer, general superintendent. Plant investment will be about \$35,000. Agstone production will be 50 tons an hour. The company also will operate about 20 trucks for deliveries, 15 of which will be equipped with agricultural limestone spreading apparatus. J. G. Hayes, a brother of the owner of the company, will be superintendent of the plant.

To Produce Ballast

NORTHERN PACIFIC RAILWAY Co., St. Paul, Minn., has announced through Chief Engineer Bernard Blum that a large crushing plant is being built at Waite Park, near St. Cloud, Minn., to process reject stone from St. Cloud granite quarry operations for track ballast. More than 100,000 cu. yd. of ballast will be taken out this year to be laid on the main line between the Twin Cities and Mandan, N. D.

Sell Stone Plant

HOPKINSVILLE STONE Co., Hopkinsville, Ky., is being offered for sale at public auction on May 7th. Partners in this enterprise are A. M. Andrew, W. H. Petri.

Start Crushing Unit

THE WILLINGHAM-LITTLE STONE Co., Atlanta, Ga., is building a new plant at Whitestone. This plant will be about a mile north of its "Upper" plant and located on what is known as the Gober property where another deposit of dolomite is being opened up. About 25 men will be employed.

Open Gravel Plant

COLUMBIA ROCK AND GRAVEL Co., Sonora, Calif., has started up operations at its plant near the former Recreation Park, Columbia, Calif. W. E. Grant is manager of the plant.

Organize Agricultural Limestone Division

National Crushed Stone Association sets up new organization to serve agricultural limestone producers

AT A SPECIAL MEETING of the National Crushed Stone Association in Cincinnati, Ohio, on April 5 and 6, an Agricultural Limestone Division was formed to give undivided attention to needs of agricultural limestone producers. It was a representative meeting of both large and small producers from all sections of the country. The new division will have autonomy as to the management of its affairs, subject only to the Articles of Incorporation and By-Laws of the National Crushed Stone Association.

A program of activities to be engaged in by the Division was developed by a committee elected by those present which will be sent to all agricultural limestone producers.

Henry A. Huschke, now with the O.P.A., and widely known to the industry as a speaker before conventions, will be the staff executive in charge of this division, starting June 1. Mr. Huschke has had over 15 years' experience in the promotion of agricultural liming materials. He graduated from Cornell in 1922, having majored in agronomy, and is well qualified to undertake this work.

A board of directors, executive committee, and chairman were elected for the interim period until O.D.T. regulations will permit an industry-wide meeting of agricultural limestone producers. Howard M. Thomas of Fort Scott, Kansas, was elected as the interim chairman of the Agricultural Limestone Division. Personnel of the board and the executive committee will be announced later. Twenty-nine producers were elected to the board of directors of the Division and eight producers were elected to the executive committee, who will be representative of the agricultural limestone industry geographically and by size of operation.

The executive committee was given authority to develop appropriate by-laws for the conduct of the affairs of the Division for submission to a meeting of the Board of Directors of the Division for approval, such meeting of the board to be held the latter part of July or the first part of August.

Those present at the meeting include the following: Harry Battin, Callanan Road Improvement Co., South Bethlehem, N. Y.; W. L. Bryan, W. J. Bryan & Son, Red Wing, Minn.; W. N. Carter, National Stone Co., Joliet, Ill.; Paul I. Detwiler, New Enterprise Stone & Lime Co., New Enter-

prise, Penn.; Earl Dingle, Harry T. Campbell Sons Co., Inc., Towson, Md.; James Eells, Basic Dolomite, Inc., Cleveland, Ohio; Otho M. Graves, General Crushed Stone Co., Easton, Penn.; E. E. Haapala, Zumbrota, Minn.; W. L. Heckathorn, Stuntz & Yeoman Lime Quarries, Delphi, Ind.; Philip E. Heim, Carbon Limestone Co., Youngstown, Ohio; R. P. Immel, American Limestone Co., Knoxville, Tenn.; E. J. Krause, Columbia Quarry Co., St. Louis, Mo.; Verne C. Morgan, Kentucky Stone Co., Louisville, Ky.; Floyd Mumma, Midwest Agricultural Limestone Institute, Decatur, Ill.; Paul M. Nauman, Dubuque Stone Products Co., Dubuque, Iowa; Ivor Nielson, Hector Construction Co., Hector, Minn.; Russell Rarey, Marble Cliff Quarries Co., Columbus, Ohio; A. B. Rodes, Franklin Limestone Co., Nashville, Tenn.; C. M. Sims, Campbell Limestone Co., Gaffney, S. C.; O. M. Stull, Liberty Limestone Corp., Buchanan, Va.; Howard M. Thomas, Fort Scott Hydraulic Cement Co., Fort Scott, Kans.; D. L. Williams, Virginian Limestone Corp., Ripplemead, Va.; W. F. Wise, Southwest Stone Co., Dallas, Texas; J. R. Boyd, National Crushed Stone Association, Washington, D. C.; and Henry A. Huschke, Washington, D. C.

Celotex Acquires Texas Plaster

THE CELOTEX CO., Chicago, Ill., has acquired the property and business of the Texas Cement Plaster Co. The Texas company, formerly owned by S. M. Gloyd, has plants in Plasterco and Longworth, Texas, with headquarters in Oklahoma City, Okla. It manufactures and distributes gypsum plaster and board products.

New Gravel Concern

PENDLETON SAND & GRAVEL Co., Pendleton, Ore., is the name of a new company which has been organized by Norris H. Looney, formerly of Salem, Ore., and Gar Powers and Ray Colgan of Pendleton. A plant is being built two miles south of Pendleton on the Pilot Rock Road.

Resume Operation

ALPHA PORTLAND CEMENT Co., Iron-ton, Ohio, plant resumed operations April 2, after a short shut-down period during which repairs were completed, according to a local announcement made by Ernest F. Brownstead, superintendent.



Batching plants supplying concrete for large naval supply base in California

Concrete Batching for Navy

IN the accompanying illustration is shown the modern batching plant set up to supply concrete for the \$25,000,000 naval supply base now under construction at Rough and Ready Island in California.

The Blaw-Knox concrete batching and mixing plant, owned by the Calaveras Cement Co., San Francisco, Calif., and operated by the contractor, has a four-compartment, 180-ton capacity bin for aggregates which are supplied by an inclined belt conveyor from a reclaiming tunnel under the aggregate stockpiles. Bulk cement is delivered to the plant by Calaveras Cement Company trucks in 30-bbl. bulk containers and elevated into the 300-bbl. capacity cement bins. The cement is fed into automatic weighing batchers by motor-driven screw feeders. Aggregates are batched through four-beam scale weighing batchers.

Of the two plants, one has a dual drum 34-E paving mixer for the production of ready mixed concrete for short haul delivery; the other plant is used to charge truck mixers.

Building Material Forecast

WAR PRODUCTION BOARD has sent out its construction materials summary figures for the first quarter of 1945. Total production of concrete block for March, 1945, was 18,200,000 block which compares with 19,300,000 block in the same month a year ago. The March, 1945, production comprises 3,000,000 block for war plant expansion, 6,700,000 block for civilian housing, 2,500,000 block for other construction, and 6,000,000 block for maintenance, exports, etc. Estimated production in April, 1945, is 17,800,000.

Cement shipments in March, 1945, were 5,873,000 bbls., as compared with 5,176,000 bbls. in March, 1944. Estimated shipments in April, 1945, are 7,662,000 bbls.

Gypsum board shipments in March,

1945, were 159,000,000 sq. ft., which compares with 184,000,000 sq. ft. in March, 1944. Estimated shipments in April, 1945, are 137,000,000 sq. ft.

1945 Cement Requirements

WAR PRODUCTION BOARD estimates 1945 domestic cement requirements at 81,900,000 bbls., and exports of 7,500,000 bbls. This represents a decrease of 6.4 percent from 1944 domestic shipments and an increase of 11 percent in exports. The export increase may be almost entirely attributed to military requirements. Domestic shipments of cement in 1944 were 87,477,000 bbls., and exports were 6,757,000, a total of 94,234,000 bbls. In October, 1944, the War Production Board estimated cement requirements in 1945 at 108,744,000 bbls., based on a one-front war. Due to later military developments, the Construction Research Division, Bureau of Program and Statistics of W.P.B., prepared estimates of cement requirements in 1945 based on a full scale war, showing a total of 89,400,000 bbls. These figures may have to be changed considerably if the wars on both fronts should cease in 1945, although it is not believed generally that heavy construction can get under way in large volume until late in the year.

Form Joist Association

MANUFACTURERS of Lith-I-Bar concrete joists recently held a meeting in Philadelphia, Penn., and formed an association which will be known as Lith-I-Bar Associates. The headquarters and office of the association will be located in New Haven, Conn., P.O. Box 606, with Herman Frauenfelder, secretary, in charge. Members of the association are as follows: The Formigil Corporation, Philadelphia, Penn.; The Dextone Co., New Haven, 3, Conn.; Gravel Products Corporation, Buffalo, N. Y.; Otto Buehner & Co., Salt Lake City 5, Utah; Lith-I-Bar Co. of California, Los Angeles, Calif.; Economy Cast Stone Co.,

Richmond, Va.; Arnold Stone Co., Greensboro, N. C.; and Cambridge Cement Stone Co., Boston, Mass.

Plant Expansion

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., has announced through E. J. Goodpastor, vice-president, that the company has a post-war construction program involving three new plants for the production of gravel, crushed gravel and sand, and two plants for production of sand. The first of the plants to be built will be the largest with a capacity of approximately 600 tons per hour. The other two gravel plants will be built at intervals of about a year with the sand plants probably being erected sometime during the same period.

Cancel A.S.T.M. Meeting

THE AMERICAN SOCIETY FOR TESTING MATERIALS has announced the cancellation of its annual meeting and exhibit originally scheduled for Buffalo, N. Y., June 18 to 22, inclusive. A business session will be held, probably the last week in June, in New York City. The Society will proceed with the printing of its technical papers and reports that would normally have been presented and these will be distributed to the members as is customary.

Glacier Gravel Office

GLACIER SAND & GRAVEL CO., Seattle, Wash., has announced through Arthur Dresser, manager, that bids have been received for the construction of a one-story office building 36 x 150-ft., which will serve as Puget Sound headquarters for five divisions of the Kaiser interests, including Permanent Cement Corporation, Permanent Metals Corporation, Kaiser, Inc. (iron and steel department), Glacier Sand & Gravel Co., and Standard Gypsum Co.

Pavement Yardage

AWARDS of concrete pavement for March, 1945, have been announced by the Portland Cement Association as follows:

	Sq. Yds. Awarded	During First 3
	March, 1945	Mos. 1945
Roads	428,983	790,937
Streets & Alleys ..	173,022	458,339
Airports	463,900	1,712,511
Total	1,065,905	2,941,787

Correction

ON PAGE 88 of the April issue of ROCK PRODUCTS, the name of the general superintendent of the Marble Cliff Quarries Co., Columbus, Ohio, was inadvertently given as A. W. Brown. This should be R. W. Bowen.

Aggregate Grading The Key to Concrete Economy

SCIENTIFIC DESIGN of concrete proportions comprises two distinct but inseparable phases—design for quality and design for economy. The engineer responsible for the structure must secure the qualities presupposed in the design—strength, impermeability, resistance to cracking, etc. The contractor, on the other hand, must secure maximum economy if he is to successfully meet competition. These two requirements are apparently hostile, yet by proper design and control of the mix, both can be met with profit to all concerned. Exactly the same problems are presented to the concrete products manufacturer and the same principles apply in meeting them successfully.

Quality depends primarily on the relative amounts of cement and mixing water, the cement/water ratio; economy depends upon reducing the amount of cement per unit of concrete, since cement is by far the most expensive ingredient of the mix. Paradoxically, reduction of cement content within limits actually results in better concrete, as will be shown later.

To successfully meet these opposing requirements the maximum possible amount of aggregate compatible with job conditions must be mixed with a cement/water paste which will give the required quality in the resulting concrete.

Water is by far the hardest ingredient in the mix to control, and it is one of the two most important. Its precise control is imperative. One pound (1 pint) of excess water per bag of cement reduces the unit compressive strength of the concrete approximately 100 lbs.—a high price to pay for water. This 100 to 1 ratio assumes further importance when the capacity of aggregate to carry surface water is considered, for of course any water carried into the mix with the aggregate becomes part of the total available mixing water. The sand can carry as much as 18 percent of its dry weight, and crushed rock and gravel as much as 10 percent; 4 percent and 2 percent, respectively, are very common under job conditions. Even with this latter relatively very small amount of surface water, the aggregates used per bag of cement will contain approximately 15 lbs. of water available for mixing

How and why the cement/water ratio controls quality and aggregate grading controls economy

By R. E. ROBB*

with the cement. This 15 lbs. of water will cut the strength of the concrete approximately 1500 p.s.i.—from a designed 3500 p.s.i. to an actual 2000 p.s.i.—if accurate compensation is not made by reducing the amount of water added to the batch.

Too much cement may also, under certain conditions and uses, be injurious to the concrete by increasing the tendency to cracking. Not only does an increase in the amount of cement/water paste produce more volume change, as is shown below, but an increase in the richness of the paste also has the same effect.

Economy—Cutting Costs by Grading Aggregate

Cement is the largest single item of expense on the ordinary concrete job, or in the manufacture of concrete products. It may amount to as much as 30 percent of the total cost of concrete in place, or 50 percent of the cost of all material.

Resistance to volume change, which causes cracking in the concrete, is of vital importance. Other things being equal, that concrete is best which shows the least volume change under variations of moisture and temperature. The element in concrete which is most subject to volume change is the hardened cement/water paste. Sand, gravel and stone particles used in concrete ordinarily are, and in all cases should be dense and hard and have little porosity. Volume change in such particles is practically zero.

A concept which may be of value in visualizing such an ideal mixture is to consider that the cement/water paste is a glue binding the particles together, and is the weakest element in the combination. Also it is the most expensive. The ideal mixture then will be one in which there is only a thin film of the glue between any of the particles of the aggregate. The aggregate obviously will have to consist of particles ranging in size from those of the finest dust up to the largest which can effectively be used. Such a mixture would be too dry and harsh to use on con-

struction work under any except the most ideal conditions of placement, and with the use of a vibrator or mechanical tamper, but can be closely approximated in the concrete products plant.

Since the grading of aggregate is of primary importance in securing an optimum mixture, an examination of the physical changes which take place when a rock is crushed will help to make clear certain principles of grading.

A general principle which may be considered the law for maximum economy in grading concrete mixtures is as follows: *If smaller aggregate is used in a concrete mix than could have been used and still obtain satisfactory placement, the absolute volume of aggregate in the concrete is decreased and the amount of cement required is increased.* Or, in abbreviated form: *Using smaller aggregate than could have been used wastes cement.* It should be remembered that not only is the cost increased, but the danger of cracking is also increased if more cement or cement/water paste than necessary is used.

One apparent exception to the above principle should be noted, the necessity of adding extreme fines to many mixes. Many fine aggregates are deficient in material passing the No. 50, No. 100 and No. 200 sieves. If this deficiency is not remedied by the addition of these sizes, additional cement paste will be required to fill the voids in the sand. However, if the particles of cement are considered as aggregate in so far as occupying space is concerned, it is evident that the principle cited above applies here too.

The cost of a concrete mixture decreases with increase in the maximum size of aggregate particles and with the use of larger sizes to replace smaller sizes, within allowable limits. Too large a proportion of the larger sizes results in a harsh, hard to place concrete, with segregation. Too large a proportion of small particles increases the cost and decreases the quality through increase in volume change.

*Consulting engineer.

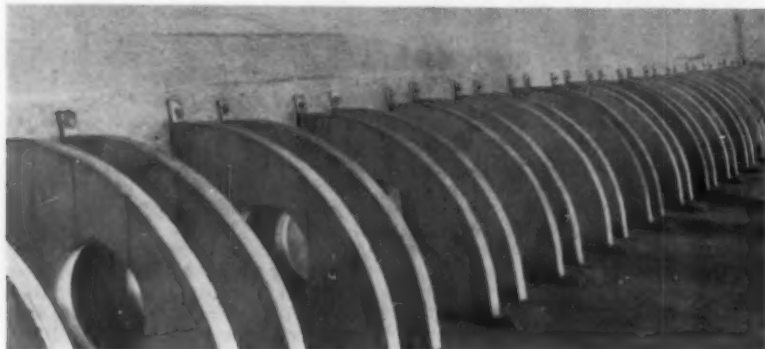
HINTS *and* HELPS

Practical Ideas Developed by Operating Men

Concrete Bicycle Rack

CANADA CEMENT CO., LTD., Montreal, Que., has devised a very convenient bicycle rack for its mill employees which is shown in the accompanying illustration. With gas

24 such switches provide maximum flexibility of control. Lamps are arranged in three groups of five, 15 in. apart, to bake out three armatures simultaneously. The power supply is single phase, three-wire, and the total load is 30 kw.



Bicycle rack in kiln room of Canada Cement Co., Ltd., plant

rationing, an increasing number of employees resorted to bicycles for transportation to and from work, and the company decided to provide convenient racks in the kiln room as a safety measure and to prevent stealing.

As may be noted the circular segments of concrete were precast with lugs provided at each corner of the arc so that they may be securely fastened to the walls and floor.

Radiant Heat for Armature Repairs

ONE OF THE PROBLEMS encountered in getting armatures of motors back in service after they have been rewound is the long period required to dry the insulating varnish. A bulletin issued by Westinghouse Electric & Manufacturing Co., points out that armatures can be dried in one-half to one-third the time by using 120-250 watt infra-red lamps. For example, an 18-in. armature, requiring 30 hours in the convection oven is baked in 8 hours under infra-red, while a small 6-in. armature requires less than half this time to bake out.

In the installation described, first cost was reduced by using the original brick oven. The old doors were removed, the roof ventilated, and the two banks of infra-red lamps were suspended on barn door hangers. Each bank of 60 lamps consists of four rows mounted in a semi circle, with a 27-in. radius. The barn door hangers permit moving the banks so the lamps may be placed the proper distance from the armature surface.

Each group of five lamps is controlled by a 20-amp. safety switch;

could have been solved by installing a noiseless pinion, but it was decided to investigate the possibility of converting the gear drive into a belt drive.

As indicated in the illustration, a flat band was welded onto the tips of the gear teeth to form a pulley, and the shafts were set farther apart. The belt drive takes care of the load without any noise, and the output has been increased 20 percent.

Welding Crusher Plates

DIFFICULTIES experienced in getting new parts has stimulated the use of welding to restore worn surfaces. G. H. Mead, in a paper before the Canadian Institute of Mining and Metallurgy, described a method of rebuilding worn corrugations on jaw crusher plates by electric welding.

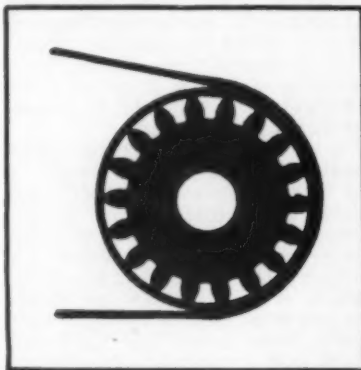
As shown in the illustration, instead of replacing the whole of the worn metal by deposition welding, round manganese-nickel steel applicator bars were used to form the body of the corrugation, the bars being attached to the crusher plate by fillet welds. To avoid warping, it is essential that short lengths of the applicator bar are used and the welding operator should move from one part of the plate to another at frequent intervals to distribute the heat uniformly, and to peen the applicator bar and weld metal thoroughly while the metal is hot.

Applicator bars should be kept slightly above the plate, by using a match or other spacer material, to allow for free contraction on cooling. Clearance also is left between the ends of the bars in each row for the same reason, the gaps being filled by welding when the rest of the repair is completed. After all the bars are secured to the plate by a tack-weld at each end, the fillet welds are applied by laying a full length electrode on one side of a bar, peening the de-

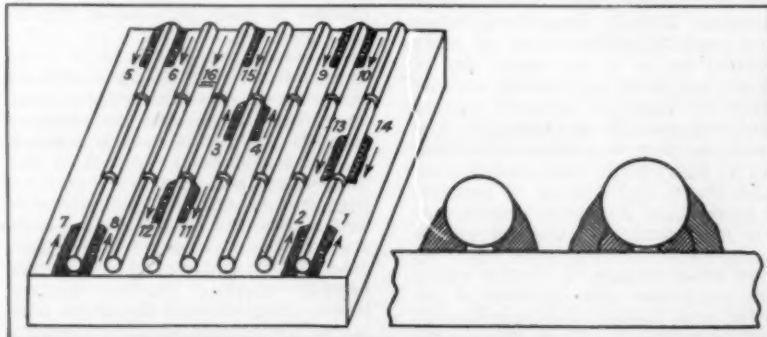
Make Gear Drive Noiseless

By W. F. SCHAPHORST

IN A WESTERN PLANT, a gear drive became so noisy that it got on the nerves of the workers. The problem



Convert gear drive to belt drive



Left: Showing how applicator bars are welded, numerals indicating order of welding. Right: Cross-section of applicator bar welding

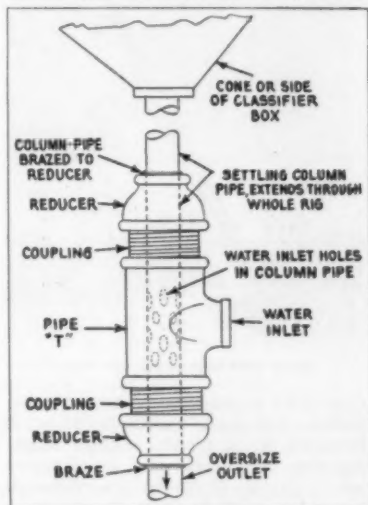
HINTS AND HELPS

posited metal, applying another full length electrode on the other side of the bar, going in the same direction, peening this metal, and repeating these operations at another part of the plate. After all the bars are attached by one full length electrode on each side, a second fillet should be applied to each, as shown in the illustration. Mr. Mead recommended that 3½ percent manganese-nickel bare electrode be used throughout, the first fillet being deposited with a 3/16-in. electrode, and the finishing bead with a ¼-in. electrode.

Vortex for Classifier

By J. F. PRUYN

IN THE ACCOMPANYING ILLUSTRATION is shown a vortex which may serve



Vortex used for hydraulic classification made from pipe fittings

for some hydraulic classifier operations if commercial equipment cannot be obtained. Some old pipe fittings, and a small drill are all that is required to make the vortex. If proper fittings can be located, the two small brazing jobs indicated on the drawing also can be eliminated.

These vortices can be made in any size. An improvement to the design shown in the sketch can be made by attaching a smaller diameter settling or sorting column pipe just below the holes. A pipe of smaller O. D. can be inserted in the lower end of the column pipe to accomplish this end. A small length of glass tubing serves the purpose.

Pipe Handling Equipment

TURLOCK CONCRETE PIPE CO., Turlock, Calif., has developed some ingenious equipment to more efficiently handle concrete pipe and forms. Jess Blaker and Gene Crawford, operators of this plant, worked out the plans for these machines.

The pipe loader, shown in one of the illustrations, was built largely from a truck rear end and a light automotive engine supported in a frame which is mounted on three pneumatic tires. This arrangement permits easy maneuverability in the yard. It is equipped with a hydraulic-operated, clutch-controlled hoist, and can stack pipe to a height of 7 ft. 10 in. Two 36-in. pipe, 30 in. long, can be handled with this machine.

Another interesting machine, called the "Go-Devil," is used to move the pipe form and finished pipe to wherever they are to be stripped. It is equipped with a 6-hp. air-cooled gasoline motor driving through a passenger car type rear end. A hydraulic lift pump actuates the arms at the front which raises the pipe form. The brake is rather ingenious in that it works immediately the operator gets off the machine, and it is released when he gets on. This action also automatically speeds up the throttle.

A third product of this company's inventive owners is a pipe machine, shown in one of the illustrations. It has Timken bearings for all moving parts; it has a geared head motor and a V-belt drive; and it is capable of producing 900 lineal feet of 16-in. pipe per day. A two-sack Besser



Left to right: Jess Blaker and Gene Crawford

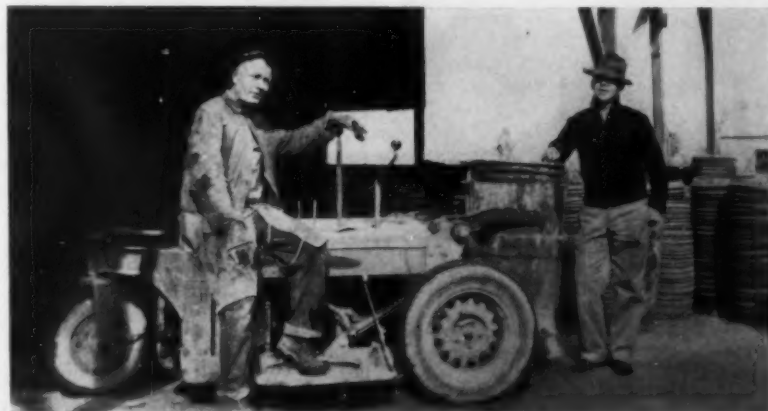


Pipe loader equipped with hydraulic hoist

mixer is located below the floor level, and the mixed concrete is raised in a skip to the hopper which feeds the machine by means of a chute.



Produces 900 lin. ft. of 16-in. pipe per day



Special machine developed for handling pipe forms

NEW Machinery

Rapid Loader

JAEGER MACHINE Co., Columbus, Ohio, has developed a loader with a 180 deg. swinging boom which enables it to load trucks from either



Easily maneuverable loader

side without backing and turning the entire machine. Crowding, hoisting, swinging and dumping are accomplished in one rapid, continuous movement. Power controlled buckets enable operator to control dumping as desired and to close bucket while it is being returned to loading position. Two speeds for boom operation are available, independent of traction.

The loader is equipped with either a 65 hp. gas or Diesel engine. It has a front wheel drive and pneumatic tires that carry 80 percent of the load and a low gear traction speed of $\frac{3}{4}$ m.p.h., which is said to provide ample crowding power to dig into stone piles. Six forward and six reverse travel speeds up to 15 m.p.h. and power steering enable the machine to travel to and from the job under its own power. The loader is designed for the use of interchangeable buckets of $\frac{1}{2}$ - to 2-cu. yd., which permits a single machine to handle a wide range of material.

With crane booms of 12,000 lbs. capacity or 7000 lbs. capacity fork lift, which can be installed as attachments, the same machine may also be used for handling concrete pipe and other products. The machine was originally developed for the U. S. Navy and large industrial war plants.

Oil or Gas Diesel

THE COOPER-BESSEMER CORPORATION, Mount Vernon, Ohio, has developed a Diesel engine which will enable the engine operator to use either gas or oil as fuel without any electrical sparking device. It is claimed that this design will cut fuel consumption of gas engines by from 20 to 25 percent. According to Ralph L. Boyer, chief engineer of the company, experimentation starting in 1928 finally has culminated in the

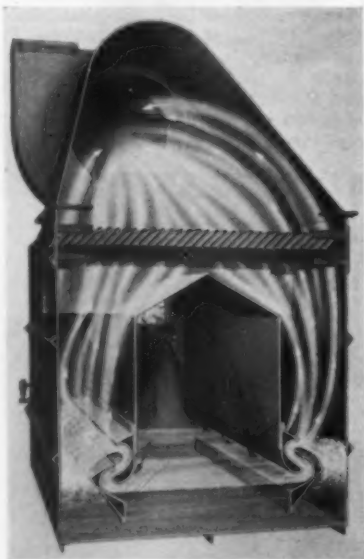
successful operation of a natural gas engine on the Diesel principle. This enables the unit to operate on a wide variety of fuels, including fuel oil, natural gas, manufactured and coke oven gases, sewage gas, and refinery by-products. Heretofore, it has been thought necessary to inject the gas under high pressure of from 1200 to 1500 p.s.i., the new development makes possible the use of gas at normal pressure and the change from one fuel to another without the necessity of a shut-down.

Wet Type Dust Collector

AMERICAN AIR FILTER CO., INC., Louisville, Ky., has brought out its Type N Rotoclone dust collector which operates on the principle of hydrostatic separation.

The air is cleaned by a combination of centrifugal force and intimate intermixing of water and dust laden air. Air, forced through the sinuous passage of the stationary impeller, induces a heavy sheet of water to move along the surface of the impeller blades creating a water curtain in the form of a reverse "S" through which the air must penetrate. High collection efficiency is said to be the result of the impingement of the dust in water due to the centrifugal action in the impeller and the scrubbing action of the water curtain.

This type dust collector is manufactured in three classes and 13 sizes for the exhaust of air columns from 1000 to 25,000 c.f.m.



Cross section of dust collector showing how dust laden air is cleaned

Mobile Crane

UNIT CRANE & SHOVEL CORPORATION, Milwaukee, Wis., has introduced a mobile crane which may have a number of applications in the rock products industry for stacking concrete products, such as floor slabs, pipe, etc., and for installation of concrete joists, roof and floor slabs.

The full-vision cab affords the operator an unobstructed view in all



Crane with dual-purpose jib boom

directions at all times. This self-propelled, one-man operated crane is powered by a single engine, either gasoline or Diesel, and is equipped with an all-purpose, jib-extension boom for multiple yard operations.

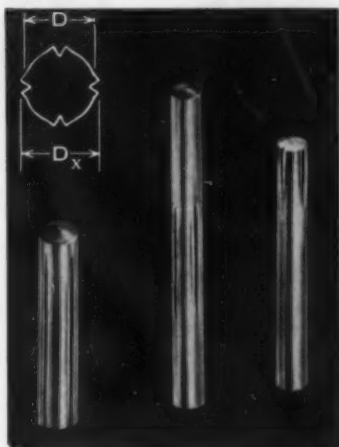
Rated lifting capacity of the crane is 5 to 7 tons from the 30-ft. straight lattice boom, and the 8-ft. jib extension, it is said, will easily handle 4000 lbs. The jib is designed for close-in operations where straight boom lifting would be prohibitive. With the dual purpose boom, each hook works independently, one for light, close-up work and the other for heavy lifts.

Interchangeable Differential

THORNTON TANDEM CO., Detroit, Mich., reports that more than 100,000 of its new "G" and "J" series differentials have been manufactured for military and essential civilian use since the start of the war, according to S. F. Baker, vice-president of the company. These newer models prevent a truck from sliding, slewing, skidding and stalling caused by one wheel spinning. It is also said that the new models represent a marked improvement over the pre-war civilian types in that they are completely interchangeable with the standard conventional differential of various popular make trucks.

Self-Locking Pins

THE DRIV-LOK PIN CO., Chicago, Ill., has announced a self-anchoring pin, said to be vibration-proof, which is designed to replace taper pins, keys, cotter pins, set screws, rivets,



Vibration-resistant pins take place of keys, cotter pins, set screws or rivets

etc. These pins, which are pressed or driven into standard drilled holes, have four flutes on the surface parallel to the axis. The length and position of the flute can be controlled accurately so that full or partially grooved pins are available. Fully grooved pins have a pilot at one end so that the pin can be easily inserted.

The raised, work-hardened edges of these flutes provide an expanded diameter of a few thousandths of an inch greater than the nominal diameter of the pin. When the pin is inserted in a drilled hole, these raised edges are compressed inwardly, providing a resilient, self-locking element which, it is claimed, will hold indefinitely under vibration or shock conditions. They are available in sizes from 3/64-in. to 1/2-in. diameter, and from 3/16-in. to 4 1/2-in. in length, in any material, and in a wide variety of types.

Electronic Vulcanization

Basic patents covering electronic vulcanization of rubber and other materials have been purchased by The B. F. Goodrich Co., and The Firestone Tire & Rubber Co. The patents were originally granted on discoveries made by R. A. Dufour and H. A. Leduc of France, and by E. E. W. Kassner of Switzerland. The announcement stated that the patents would be made available both to the rubber and plastics industries on a reasonable basis.

Vulcanization is the joining of rubber molecules and sulphur. For more than a century, states the announcement, rubber has been vulcan-

ized by applying heat to the outside surfaces. Since rubber insulates against rather than conducts heat, heating of rubber products, to their core was slow and lacking in uniformity. Plastics also do not readily conduct heat, and molding them has presented similar difficulties. In electronic vulcanization, high frequency oscillations shake the molecules of rubber and sulphur millions of times a second, creating uniform heat throughout the product being vulcanized in a fraction of the time required when steam is used.

Latch for Safety Hooks

THE THOMAS LAUGHLIN CO., Portland, Maine, has designed a latch for its safety hooks used in general hoisting and materials handling. This latch is said to give 80 percent of the full throat opening, and its proper operation decreases the possibility of overloading and overcrowding.

The wider throat opening results from the way the latch assembly, when open, straddles the neck of the hook. The load to be hoisted is easily



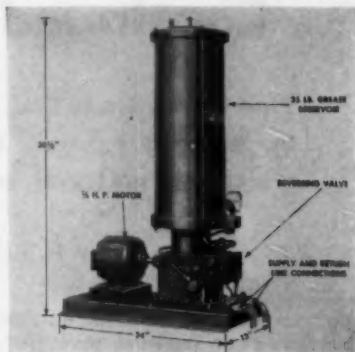
Hoisting hook has safety latch actuated by a stainless steel wire spring

slipped into the hook but cannot be removed until the operator's fingers release the latch. If the hook is overcrowded, the latch will not snap into place. If the hook spreads because of excess loading, the latch pops up as a warning signal. In the small sizes, the hook is made of pressed steel and in the larger sizes it is made of cast bronze.

Centralized Lubrication

THE FARVAL CORPORATION, Cleveland, Ohio, has developed an automatic central pumping unit, DC-25, for lubrication. It is a small size,

double plunger, slide valve type unit which provides a high pressure pump for handling all types of lubricants, including both oils and greases. Lubricant is delivered under pressure to all bearings in the system through



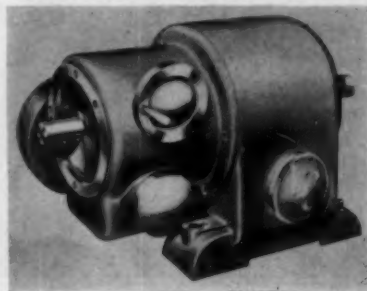
Automatic central pumping unit for lubrication

two main supply lines serving a measuring valve at each bearing. Frequency of operation is controlled by an electric time clock, and a suitable signal device is available to indicate any interruption to the normal operation of the system.

Variable Speed Drive

LOMBARD GOVERNOR CORPORATION, Ashland, Mass., has developed a variable speed drive which uses the V-belt as a control medium only, rather than for both drive and control, primary speed reduction being accomplished by conventional gearing methods. Through this new gearing arrangement, it is said that 90 percent of the power goes through conventional gears while only 10 percent passes through the V-belt, a minimum load which avoids slippage. Having the variable speed output shaft furnished concentric with the motor shaft, gives it the advantage of a direct line drive. Remote control also is available, with horizontally split casing as optional equipment.

This unit has been designed to provide an individually-controlled drive for each conveyor. The drive has a compact design and is light in weight.



Lightweight, compact variable speed drive

Stockpiling

Covered Surge Pile Assures Continued Operation

Pipe Creek Stone Co., Sweetser, Ind., has built up a large reserve of crushed stone from which all material is drawn for screening

By H. E. SWANSON

UNTERRUPTED PRODUCTION in the crushing and screening plant has been assured at the Pipe Creek Stone Co., Sweetser, Ind., by use of a surge pile interposed between the primary and secondary crushing operations. Ordinary delays in transmission of stone from the quarry to the primary crusher, or any breakdown occurring before delivery to the surge pile will not hinder the continuous production of the finished product. In the event that it is desirable to continue operations longer than the regular working period, this plant can continue to produce finished products by drawing from the surge pile when delivery to this pile has been halted.

This surge pile is approximately 80 ft. in diameter at the base and rises to a height of about 55 ft. Over the surge pile is a wooden roof, shaped to fit the upper one-third of the pile, which acts as a protective covering. The covering acts as an umbrella in rainy weather, keeping

the center of the pile dry. It also prevents extraneous materials from entering the surge pile, keeping the stone clean. The roof is supported by four 10-in. and ten 2-in. pipes, firmly imbedded in the ground. On top of the roof is a small shed which houses the head end of the belt conveyor coming from the primary crusher, and the swivel chute which allows discharge to the pile or to another belt conveyor, referred to later in this article.

Tunnel Conveyor Below Covered Surge Stockpile

At the center of the pile, below ground level, a concrete compartment has been constructed which houses the belt conveyor that feeds stone from the pile to the crushing and screening plant. This compartment, 10- x 12-ft. and 7-ft. high, has a roof located at ground level with a 30- x 24-in. opening to permit charging the belt conveyor from the pile. A steel tube, 6-ft. in diameter



Don Tharp, foreman, to the left, and Carl Jacobs, weighmaster

and 41-ft. long, runs from the concrete compartment, through the side of the surge pile, to the outside to house the belt conveyor which feeds the crushing and screening house.

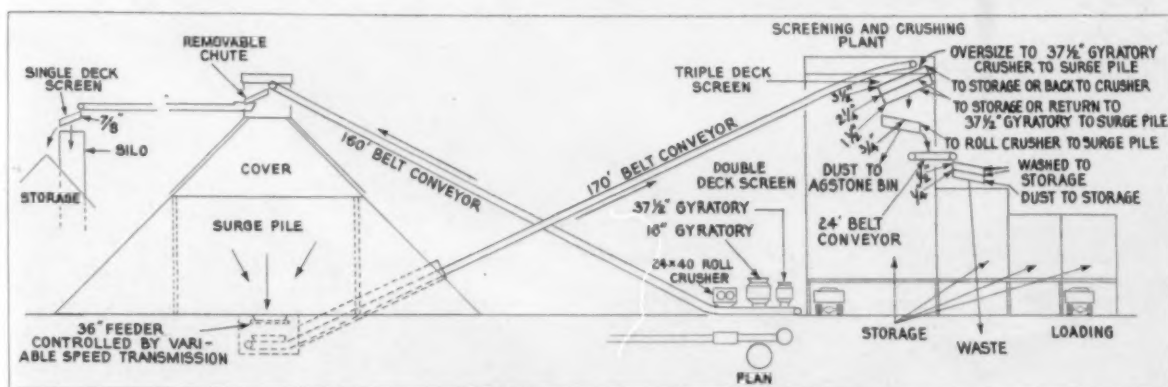
Late in 1943, a 22- x 40-in. Pioneer double roll crusher was installed for the production of more agricultural limestone. Previously the production of this material was negligible but since the addition of the roll crusher, about 30 percent of the company's output of 100 tons per hour of minus ¾-in. stone is agstone.

Quarry Operations

Stone is excavated from an 80-acre tract, of which about 25 acres have been quarried. The thickness of the layer varies from 12- to 22-ft. It is a seamed limestone which breaks readily when blasted, thus materially aiding in primary crushing op-



Left: Belt conveyor from crushers to top of surge pile. Tunnel conveyor recclaims material from surge pile for transportation to screening plant. To the extreme left is the belt conveyor to move shale to silo bin and stockpile. Right: Screening plant and bins. Waste wash water goes to pond



Layout of screening and crushing plant, showing flow of material

erations. Underneath the limestone is a deposit of blue shale, averaging 80 ft. in thickness. This shale is quarried and put through primary crushing operations and stockpiled for sale as raw material in the manufacture of rock wool. It is a valuable by-product. The overburden averages about 4 ft. in thickness and is removed by an Allis-Chalmers crawler-mounted tractor with a 12-cu. yd. LeTourneau scraper. Drilling operations are handled by a subcontractor.

Stone is loaded into three $1\frac{1}{2}$ -ton dump trucks (two Fords and one International) by a No. 75 Lorain power shovel with a $1\frac{1}{4}$ -cu yd. shovel bucket. Trucks haul the stone to a 6-in. Allis-Chalmers gyratory crusher, fed by a $5\frac{1}{2}$ x 10-ft. plate feeder. When maximum production is required, two No. 75 Lorains and five trucks are available for hauls from the quarry to primary crusher. The primary crusher reduces the stone to a top size of $3\frac{1}{2}$ in. which is fed to a 30-in. belt conveyor, 160-ft. centers, equipped with Link-Belt idlers. This conveyor feeds into the surge pile previously mentioned.

Crushing and Screening Operations

Limestone which is fed into the surge pile is reclaimed in the concrete compartment on a 24-in. belt conveyor, 170-ft. centers, equipped with Link-Belt idlers. This conveyor feeds a 4- x 8-ft. Deister triple-deck Plato screen located at the top of the screening and crushing house. Square openings in the three decks are $3\frac{1}{2}$ -in., $2\frac{1}{4}$ -in., and $1\frac{1}{2}$ -in., respectively. Oversize from the top deck goes to a No. $37\frac{1}{2}$ Kennedy gearless gyratory crusher for return to the surge pile via the first belt conveyor. This crusher produces a top size of $1\frac{1}{2}$ -in. Stone retained on the middle and bottom decks is sent to separate storage bins as finished products. When these bins are full, the stone is sent from the screens to the Kennedy crusher for return to the surge pile.

Stone passing the bottom deck goes to a 4- x 8-ft. Deister double deck Plato screen which has $\frac{3}{4}$ -in. square openings on the top deck. The bottom deck is a dust screen. Oversize from the top deck is sent to the

Pioneer roll crusher mentioned earlier in this article, for recrushing and return to the surge pile. Stone passing the upper deck goes to a 24-in. belt conveyor, 12-ft. centers, which

(Continued on page 70)



Overall view of screening plant, to the left, and surge pile



View of quarry which extends a considerable distance from plant. A corner of surge pile may be seen to the right in the illustration



La Calera portland cement plant, located between Santiago and Valparaíso, Chile, operated by Fábrica de Cemento de El Melón

Chile Needs Cement

WITH only two percent of the highways paved and with an actual shortage of 400,000 dwelling units, Chile urgently needs an increase in cement production. Earthquakes and fire have taken their toll of buildings in this country, and present another reason why more concrete construction is desirable. Many houses are very old as four centuries have elapsed since Pedro de Valdivia built the first house in Chile in 1542. On the other hand, Chile has very advanced social laws and every working man, even though he may have no private means, can own a house, using credits granted by law. A special public works program will start in 1945, and reconstruction of the provinces of Nuble, Cauquenes and Concepción destroyed by the 1939 earthquake has barely reached 20 percent of requirements. All these factors have combined to set up requirements for 1,000,000 metric tons (1,102,300 short tons) of cement capacity by 1950. The accompanying graph shows the consumption, production, importation, for the period from 1922 to 1944, and estimated requirements for cement up to 1952.

Two plants are now in existence: Fábrica de Cemento de El Melón, S. A., with a production of 485,000 metric tons annually (534,000 short tons); and Sociedad de Cemento Juan Soldado, S. A., recently erected, with a potential production of 200,000 metric tons (220,500 short tons). Two other plants are now being planned: Fábrica de Cemento Portland Polpaico, with a potential production of 200,000 metric tons (220,500 short tons); and the San Fernando plant

*Civil engineer, member A.I.M.E., Santiago, Chile.

By LUIS MONGE MIRA*

Planning to build two new cement plants to supplement production of two existing mills which will care for requirements to 1950

with a projected production of 150,000 metric tons.

El Melon Plant

Although the Juan Soldado plant is scheduled for early production, the only Chilean portland cement mill now in operation is owned by Fábrica de Cemento de El Melón.



Luis Monge Mira

S. A., which was founded in 1906. The first mill, with an initial capacity of 40,000 metric tons per year, was erected by P. L. Smidth & Co., Copenhagen, but successive expansions have increased this capacity to a rated output of 428,000 metric tons. There are three 10- x 170-ft. Traylor kilns and two other 10- x 240-ft. kilns now in operation, and two Vulcan Iron Works 8- x 9½- x 300-ft. kilns which will start production shortly, increasing capacity by 120,000 metric tons annually. It is a dry process plant.

This mill is strategically located between Santiago and Valparaíso, at La Calera on the long north and south railway which provides connections to the entire country.

Raw material comprises a mixture of two types of clayey limestone: one found at La Calera, two miles from the plant, with an average grade of 73 percent CaCO_3 , and the other at El Navio, 10 miles from the plant, with an average of 84 percent CaCO_3 . Average analysis shows the following percentages: CaCO_3 , 44.4; SiO_2 , 14.6; R_2O_3 , 6.9; MgO , 1.2; and calculated losses, 33.9. There are five strata from which limestone is mined at the two locations, thickness varying from 14 to 45 ft. The room-and-pillar method (30- x 13-ft.) is used for mining. Stone is hauled by electric locomotives to primary crushing plants near the mines. Minus 4-in. stone at La Calera is fed through a 700-ft. ore chute and a tunnel to the secondary crushing plant at the foot of a hill from which point it is moved to the plant on a 2-ft. gage Decauville track. Crushed limestone from El Navio is hauled to the mill in special one meter gage railroad cars. Compressed air equipment at the mines

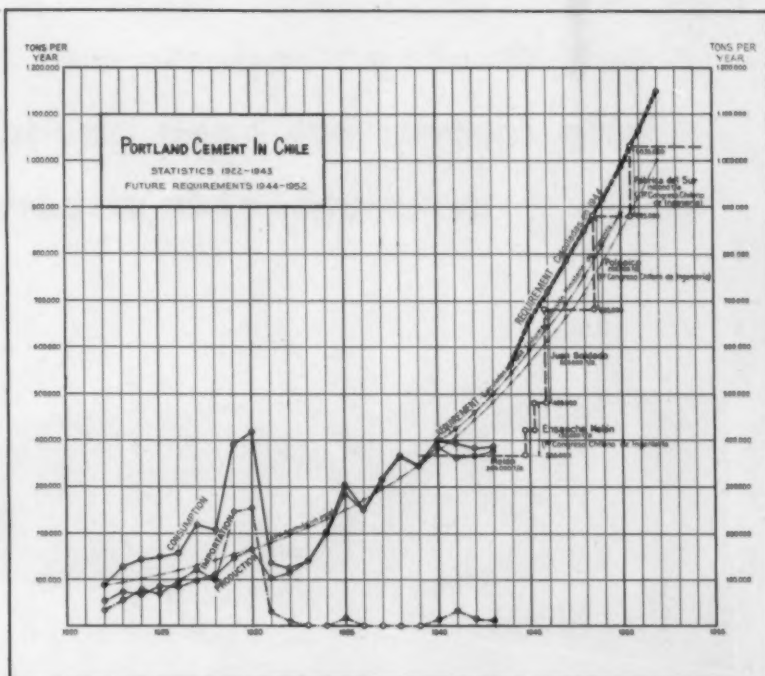
CONSTRUCTION

includes five 2,000 c.f.m. compressors, both Ingersoll and Sullivan types. Raw material is ground in Traylor tube mills. Power is generated at its own plant at Rio Blanco, Oconagua, having a capacity of 15,000 kw. The cement plant requirements are 8,000 kw., and the remaining power is sold.

Fuel for cement manufacture is a Chilean bituminous coal with a heat value of 12,600 B.t.u. mixed with lignite of 9,900 B.t.u., shipped to the plant by water and rail transportation. Gypsum is shipped to the plant by rail from Petorca and from the province of Coquimbo.

The company manufactures the following types of portland cement: Standard Melon, Waterproof Melon, Super Melon, and White Melon; all sold in paper sacks containing 93.7 lb. of cement. It also produces agricultural limestone and phosphate. Phosphates are obtained from apatite shipped from mines which the company owns in Coquimbo province. Five small F. L. Smidth 87 ft. long kilns, previously used in the cement mill, are now installed at the lime and phosphate plant.

Officials of this company include:



Curves showing production, consumption, and importation of portland cement in Chile from 1922 to 1943, estimated requirements up to 1952, and proposed increases in plant capacity.

E. Matte O., president; E. Ariztia, general manager; E. Delgeon, general plant superintendent; H. Edwards, chief engineer; R. Mateluna and E. Simian, plant engineers; B. Drouilly, chief chemist; H. Canguilhem and R. Cabezon, technical department.

Juan Soldado Plant

Organized in 1942, the Sociedad de Cemento Juan Soldado, S. A., is partly financed with private capital and partly by the Chilean government through the Corporación de Fomento de la Producción (Chilean Development Corporation). Capital of \$1,333,000 will be increased by an amount which has not been determined so far, but will be augmented as a result of plant expansion to 200,000 metric tons annually. Initial production will be 100,000 tons annually.

The plant (wet process) is located on Coquimbo Bay, 200 miles north of Valparaiso, a mile from the coast and eight miles from the Longitudinal Railroad at La Serena, 15 miles from the port of Coquimbo. It is planned to start operations April, 1945.

This plant is located close to a deposit of conglomerate sea shells, having a thickness which varies between 10 to 40 ft., which will be mined from open pits. A Marion No. 480 electric shovel will load material into Easton semi-trailers for haulage to the crushing plant. A previous separation will discard the minus 1/4-in. material. After crushing to minus 65-mesh, the plus 325-mesh,

minus 65-mesh material will be concentrated by flotation in twelve 56-in. Fagergren cells. The concentrate will be mixed with the minus 325-mesh fines which will not be concentrated. Tests made by the Separation Process Co., indicate the following characteristics:

Pct. by wt.	Raw Material	Slimes —325 Mesh	Flotation	
			—65 +325 Mesh Concentrate	Tailings
Analysis:				
SiO ₂	30.50%	20.00%	14.44%	69.70%
R ₂ O ₃	9.20	6.52	4.68	17.64
CaCO ₃	55.98	71.82	80.36	8.14
MgCO ₃	1.08	1.40	1.11	1.21

Clay or iron may be added when and if needed.

Calcination equipment comprises four 9 1/2- x 8- x 199-ft. reconditioned kilns, made by Vulcan Iron Works, provided with synchronized F. L. Smidth feeders and Fuller clinker coolers.

Clinker crushing and grinding equipment, the Fuller-Kinyon pumps, and four silos are designed to provide the flexibility required to manufacture simultaneously standard portland cement in one-half of the finish mill department and cement of greater specific surface in the other half. Provision has been made in the packing room for four three-spout Bates bagging machines, and for conveyors to load bags to railroad cars or trucks. Paper bags will be used.

Sly dust collectors have been provided for the clinker mills and for

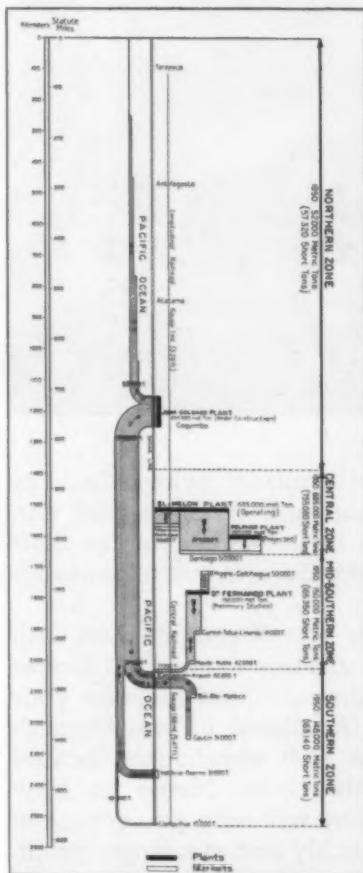


Diagram showing location of two existing cement plants in Chile and two proposed plants and distribution of cement to meet market requirements

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(Continued from page 67)

the packing plant. Kiln gases pass through a Buell dust collector following their passage through the waste heat boiler system.

Power will be generated by a turbo-generator from steam supplied by four waste heat Babcock & Wilcox boilers. Each boiler is connected to a hot gas flue from each kiln. To supplement the waste heat boilers, there are two additional Babcock & Wilcox boilers fired directly with oil or powdered coal. A 12,500 kw., 60-cycle General Electric turbo-generator was rebuilt by the manufacturer into a 10,500 kw., 50-cycle unit. Sufficient water is obtained from canals diverted from the Elqui river. The Juan Soldado plant will employ approximately 200 men for normal operation.

To obtain equipment for this plant without undue delay, the Corporacion de Fomento purchased the former Edison Cement Corporation cement mill at New Village, N. J., and also the potash plant of the same company at Piscataway, N. J. All of this equipment was dismantled, reconstructed and supplemented with new machinery, including the flotation plant, one mill, a bridge crane, clinker coolers, and other essential apparatus.

Cement will be shipped by rail from the plant and by sea from the port of Coquimbo, 16 miles from the plant. This plant will supply cement to the extreme northern and southern provinces of Chile, using chiefly low cost ocean transportation.

Officers of the company include: R. Jaramillo, former Secretary of State for Public Works, who is an outstanding Chilean business promoter and industrial magnate; M. Agosin, general plant superintendent; and C. Krumm, delegate of the Corporacion de Fomento. The complete plant was designed by F. L. Smidth & Co., New York, N. Y., in collaboration with other American engineers.

Polpaico Plant

In January, 1945, the Chilean concern of Gildemeister & Co., Ltd., purchased the Polpaico limestone deposits to supply stone for a portland cement plant to be built in accordance with a project planned in 1941 and 1942 by the consulting engineer of this firm and author of this article. Capital for the enterprise is already available, and the company, Fábrica de Cemento Portland Polpaico, will be legally organized early in 1945. Essential preparatory work, such as construction of roads, railway sidings, camps, etc., has been started, and a lime and agricultural limestone crushing plant is under construction.

Mines are located in the central zone of Chile about 20 miles northwest of Santiago, capital city, which consumes about 50 percent of the

cement used in the country. The plant site will be one mile from the Pan-American Highway, and 3½ miles from the Central Railway to which it will be reached by a branch line.

Reserves of limestone, which can be mined by open quarry methods, exceed 100,000,000 metric tons (110,230,000 short tons); positive reserves which have been blocked out amount to 32,291,420 metric tons with an average analysis of 74.09 percent CaCO₃. Part of the stone will be taken from a bed of rock from 40 to 50 ft. in thickness. This material will be blended with higher grade limestone by selective quarrying from the same bed and with clay from nearby deposits.

The following is an average analysis of the raw material:

	Run-of-Mine Quarry	Selective Quarry	Clays	
			No. 1	No. 2
SiO ₂	23.20%	11.38%	54.0%	47.1%
R ₂ O ₃	2.00	1.18	22.3	16.8
CaCO ₃	74.09	86.94	17.1	30.0
MgCO ₃	0.11	0.39	6.5	5.5
Others	0.60	0.11	0.1	0.6
	100.00%	100.00%	100.0%	100.0%

The plant site is located in the center of gravity of a zone of outcrops with a total surface of 1,274 acres. The complete mining property covers 3,575 acres. To take advantage of this situation, the mill will be constructed at the lower point of the main deposit which will have a vertical development of 165 ft., permitting transportation of the material to the mill by gravity. Raw material stock piles will be at the same elevation as the quarry and about 500 ft. from the initial face.

Chilean bituminous coal of 12,600 B.t.u. will be used. The project includes two 9- x 10- x 350-ft. kilns with heat recovery from gases and clinker. This is very essential as coal is scarce and expensive in Chile. Coal from Concepción and Arauco province delivered to the plant will cost about \$15.50 (U. S. currency) per metric ton. It is proposed to purchase power from nearby hydro-electric plants.

It will be a wet process plant, and steps are being taken to purchase the most modern equipment. Gildemeister & Co., Ltd., control the water rights which will provide ample supplies even during periods of drouth. Cost of the complete plant is estimated to be \$3,500,000 (U. S. currency). The construction of this plant has met with the approval of governmental authorities and important Chilean engineering and mining associations.

San Fernando Plant

Plans for the future expansion of the cement industry in Chile indicate the need for a fourth plant in the Mid-Southern zone of Chile (see diagram), having an initial capacity of 150,000 metric tons annually. The

author has been entrusted with the preliminary planning for this plant. It has been tentatively agreed that most favorable deposits would be those of Tinguiririca which are very extensive and show an average grade of 85 percent CaCO₃. Extraction would be done by open quarry, block caving or shrinkage stoping methods. Crushing and grinding plants would be located at the foot of the quarry. Power would be obtained at low cost from a hydro-electric power plant which would be built about a mile from the mill.

Convey Slurry 45 Miles

Limestone would be conveyed in the form of slurry, diluted in the proportion of 1:10, through a 45-mile launder, as far as the Central Valley in San Fernando, close to the railway station where the plant would be located. The most modern equipment will be purchased.

Stockpiling

(Continued from page 65)

feeds a 4- x 6½-ft. Deister triple-deck washing and sizing screen. Throughs from the dust screen go to an agstone bin.

This last mentioned triple-deck screen has ½-in. and ¼-in. square openings on the upper two decks and the bottom deck is a dust screen. Water is pumped from a nearby water hole in the quarry through a 5-in. pipe to the screen with a spray nozzle pipe at the discharge end. A Hill pump, powered by a 20-hp. G. E. motor, sends water to the screens as well as providing water for cooling the Kennedy crusher. This pump has a rated capacity of 400 g.p.m. with a 120-ft. head. An 8-in. pipe returns waste water to the water hole.

The stone which is retained on the three decks of the screen goes to separate storage bins as finished products while throughs from the bottom deck go to waste with the waste water. Storage bins are of the steel silo type and have a combined capacity of 660 tons.

A swivel chute located at the top of the surge pile allows stone to be fed to the surge pile, or when shale is being produced, it is fed to a 24-in. belt conveyor, 66-ft. centers, which discharges to a single deck screen. This screen, a 4- x 8-ft. Deister Plato, has ¾-in. square openings and is located directly above a steel silo, 5 ft. in diameter and 60 ft. high. Throughs from the screen go into this silo which has a chute located at the bottom for truck loading. Oversize goes directly into a stockpile from which it can be truckloaded by crane.

F. W. Irving, R. J. Irving and Mrs. Grace Irving are the owners of the Pipe Creek Stone Co., which started its operations in 1934. F. W. Irving is the manager and Don Tharp is foreman.

Getting Double Life Out of Cables

River Sand Co., Topeka, Kans., has a system of maintenance records and procedure to get maximum life out of cables

By JAMES A. SMITH*

WORLD WAR TWO has taught us a good many better operation and maintenance methods. At River Sand Co., on the Kaw River near Topeka, Kans., we have learned to rebuild and repair equipment; jobs which before the war would have been considered out of the question. We are large users of wire cable, mostly $\frac{3}{8}$ -in. and $\frac{1}{2}$ -in. A stepped up program of wire rope maintenance since 1941 has resulted in doubling the life of all of our cables at very little additional cost.

Cleaning, Inspecting and Greasing

A great deal of our cable is used under water, and in all of our operations the damage from sand is a factor. Before 1941 we put on a new cable; used it until it broke or showed enough wear to indicate a safety hazard. Discarded ropes were sold for junk.

Today all cables are cleaned at least once a week. When thoroughly cleaned, Superintendent Frank Butner, who has had 18 years continuous experience, makes a foot by foot inspection. If the rope clears this check it is then treated with a dressing. Only factory recommended grease is used. Three grades are employed, but

*Manager, River Sand Co., Topeka, Kan.

before the war one grade was used for all lubrication. There is a decided saving in lubricants as well as added rope life when factory recommendations are followed to the letter. Since this policy has been followed, no under water damage to cables has been experienced. To prevent damage in storage, all cables retired from cranes or use on drums are given the same cleaning and inspecting and then treated with a dressing for storage.

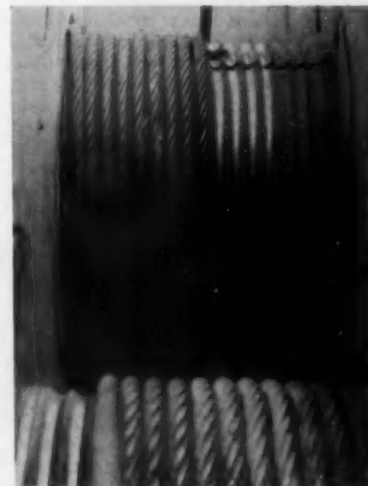
Cleaning, inspecting, and lubricating costs are estimated to be between one and two per cent of the new rope cost.

It was difficult to get the men to cooperate with the superintendent in carrying through a strict rope maintenance program, but by the cut and try process we have found that the best procedure is to have the operator clean the cable, then call the superintendent for the inspection. After inspection the operator treats the cable with the dressing and makes out the report to the main office for the rope record.

Each time the rope is cleaned and inspected, the record must show that the equipment also has been inspected. We have found that many times a sheave wheel out of line was causing rope damage, and even if a new rope was put on, the same damage showed in a short time. Any



James A. Smith, part owner and manager of River Sand Co.



Cable ends have been switched to increase life, the worn end being placed on the drum where there is less wear



Superintendent Frank Butner inspects "rock catcher" on dredge pipe line

showing of rope damage calls for a thorough examination of the equipment. A record showing a rope damaged must also show *what caused that damage*. This policy has resulted in longer life for equipment and machines as well as for cables.

Reassigning Cables

The past three years, instead of selling our retired cables, we have been using them ourselves. This has been possible due to the extra care taken of all wire ropes, and the use of preformed type cable. Preformed rope, even after heavy use, does not show the wear, broken surface wires do not spread, and there is no loss of footage from a break or from cutting.

The initial cost of the preformed is about 20 per cent higher, but this is more than off-set in the added safety factor and the savings in sec-

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Kiln Designs for Various Limestones

Development of the vertical kiln for lime manufacture from the most simple to the most elaborate design for various fuels and stone

By VICTOR J. AZBE

LIME KILN DESIGNS of the past with their low production, poor fuel efficiency and high labor requirements do not fit into the modern industrial structure. Relatively low lime prices, severe competition, and high labor and fuel costs virtually condemn operations of such kilns to bankruptcy. For these reasons, they are rapidly being supplanted.

As there are many different limestones and various lime characteristics desired with diverse fuels and capacity ranges required, one kiln design could not be made adaptable for every condition. The kiln designs shown in the accompanying illustrations have been developed over a long period of years to meet these varying conditions. Many of the features shown have been patented (Azbe) and in some cases patents have been applied for.

Fig. 1 shows a simple, natural draft, hand-fired kiln. It consists of a furnace for burning the fuel and a shaft within which limestone is calcined to lime. Capacity is limited. All combustion air passes through the furnaces and lime is drawn hot. Due to this and to variations in firing, fuel efficiency ordinarily is very poor. If this type kiln is closed off on top, Fig. 2, and put under mild induced draft with a fan, capacity can be increased. Only a mild draft of about 0.5-in. would be successful. Lime continues to be drawn hot and air enters without preheating. Capacity and fuel efficiency will be somewhat better if firing is light and frequent. Fig. 3 is a considerable improvement over the preceding designs. The simple furnaces have become deep fire boxes which, with suitable arrangement, could be operated as semi-gas producers. The shaft is equipped with a center pier to hold back the weak middle and there are special poke holes for more convenient trimming. In this type much of the air can pass through the cooler, cooling the lime to be drawn and saving its heat.

Fig. 4 shows an induced draft kiln with submerged offtake, center pier and semi-gas producers. As the fan could not possibly stand the very high gas temperature which would prevail with only day charging of stone, and night charging is often inconvenient, the kiln can be equipped with a superimposed stone storage

zone. Gas is taken from beneath this storage zone and fresh stone sinks into the active part of the kiln on every draw.

Center Burner Types

Fig. 5 shows a center burner kiln in its simplest form for producer gas firing. With this type, the center pier was built hollow and thus the center burner evolved. A further development of the center burner is shown in Fig. 6. With this design, gas may enter the center burner from ends of shaft to permit handling very large volumes of gas in high capacity operation of kilns producing from 60 to 100 tons of lime per day; from a ton to 1½ tons per square foot of shaft area. Fig. 7 shows a combination center and side burner arrangement for producer gas. This ordinarily is avoided except in cases where shafts are very wide, stone very small, or lime very friable. Fig. 8 is a two-level producer gas firing arrangement. At the regular level, gas is introduced in the normal way through a center burner. Some 5 or 6 ft. higher, an additional quantity of gas is introduced through a set of side burners. Through this arrangement much of the objection to side burners is eliminated and the advantage of a long firing zone is created.

Natural Gas Burners

Fig. 9 shows a multi-duct center burner for natural gas. In this case gas is independently controlled to eight sections and is admitted to the kiln through 24 ports. With natural gas, side burners also can be used as in Fig. 10, either on the level with center burner or for two-level gas introduction stretching out of the hot zone and improving gas distribution. Fig. 11 shows a single-end entrance natural gas center burner arranged for hot waste gas recirculation. There are six control valves. This system was designed for pre-mixing of natural gas with hot waste gas for increasing the gas volume and to lower and control hot zone temperatures.

Fig. 12 illustrates a center burner design with secondary air duct. This is intended for air introduction by normal hot zone draft to supply air

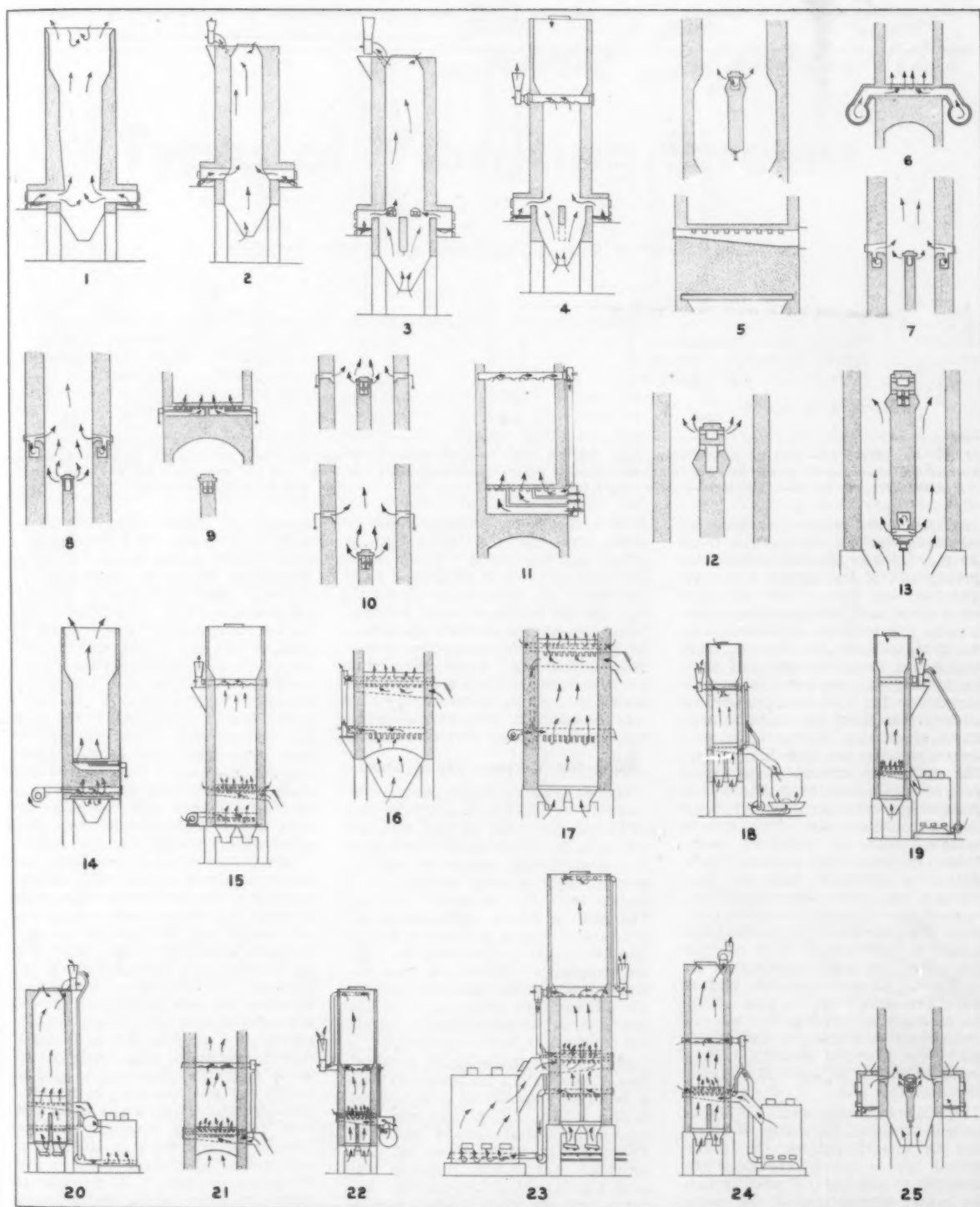
to the center portion of the kiln or under forced draft to create turbulence or to supply CO₂ containing waste gases to temper the hot zone. Fig. 13 shows a combination of the primary air duct, gas duct and secondary air duct which constitutes the complete Azbe center burning system.

Fig. 14 is an arrangement in which air may be forced into the primary gas duct of open type kilns without induced draft fans for mild forced draft operation. Fig. 15 shows how kilns may be arranged for balanced draft operation. A cold air fan supplies air for combustion through the primary air duct while the induced draft fan exhausts the products of combustion, thereby giving push-pull operating results with balanced pressure in the hot zone or only a very mild draft. Fig. 16 illustrates how primary air duct may be used for preheated air withdrawal to supply secondary air duct, assuring that all air used by the kiln is passed through the cooler. Fig. 17 shows a center burn system in which the primary duct is used as a "Dutch Oven" within which a limited amount of fuel is burned, sufficient to retain a 1650 deg. F. temperature in the zone above, creating a lime finishing zone. Fig. 18 provides temperature control of kiln and producer hot zone through waste gas recirculation. When it is a question of only CO₂ for the gas producer, connections for ordinary operation may be greatly simplified and arranged as in Fig. 19 so the producer blast fan obtains its desired CO₂ from the discharge of kiln induced draft fan. As shown in Fig. 20, it is also possible for the producer to obtain air from the primary air duct of the kiln in addition to CO₂ from the waste gas fan, assuring the use of all sensible heat of lime.

Dolomite Kilns

When dolomite is to be calcined for finishing lime, low calcination temperatures are necessary. These temperatures can be attained only by adequate recirculation of hot gases from the magnesite 1000 deg. F. zone as shown in Fig. 21. For a high capacity dolomite kiln, Fig. 22 arrangement provides a single offtake pipe connected to two fans; one draws and supplies pure hot gases for recircula-

(Continued on page 74)



Vertical lime kiln systems and their gas circuits. Fig. 1: Simple natural draft, hand-fired kiln. Fig. 2: Simple type of induced draft kiln. Fig. 3: Induced draft kiln with center pier. Fig. 4: Induced draft kiln with submerged offtake center pier and semi-gas producers. Fig. 5: Center burner in its simplest form for producer gas firing. Fig. 6: Dual gas entrance center burner for producer gas. Fig. 7: Combination center and side burner arrangement for producer gas. Fig. 8: Two-level producer gas firing arrangement. Fig. 9: Multi-duct center burner for natural gas. Fig. 10: Single or double-level firing arrangement for natural gas. Fig. 11: Single-end entrance natural gas center burner arranged for hot waste gas recirculation. Fig. 12: Center burner with secondary air duct. Fig. 13: Center burner with primary and secondary air ducts

complete. Fig. 14: Arrangement for forced draft operation of kilns. Fig. 15: Arrangement for balanced draft operation of kilns. Fig. 16: Design for supplying preheated air to secondary air duct. Fig. 17: Center burner system with incorporated lime finishing zone. Fig. 18: Temperature control of kiln and producer hot zones through waste gas recirculation. Fig. 19: Simple arrangement for CO₂ supply to producer blast. Fig. 20: Arrangement for both CO₂ and hot air supply to producer blast. Fig. 21: Hot gas recirculation for tempering of hot zone of high magnesia kilns. Fig. 22: Gas flow system for high capacity dolomite kilns. Fig. 23: Dolomitic kiln with integral producer and a continuous mechanical draw. Fig. 24: Hot gas recirculating system for high calcium kilns. Fig. 25: Design for alternate or combination firing of producer and natural gas

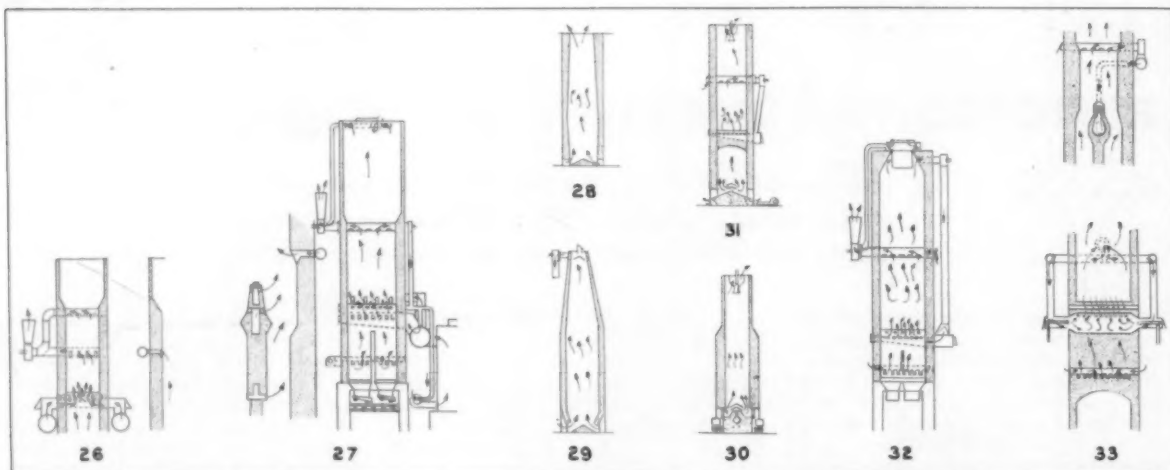


Fig. 26: Gas offtake from kilns for varying stone sizes. Fig. 27: Kiln arranged for burning spalls exclusively. Fig. 28: Simple type of mixed feed kiln. Fig. 29: Improved type induced draft, mixed feed kiln. Fig. 30: Forced draft type mixed feed kiln. Fig. 31: Recirculating system applied to mixed feed kilns. Fig. 32: Mixed feed kiln with coal as fuel. Fig. 33: Kiln for gasified oil as fuel

tion, the other handles such gases as are needed for stone preheating from the kiln top and the remainder flows directly out of the offtake pipe. All entrained air passes off with the waste gases, and the recirculating gas is only the product of combustion. Fig. 23 shows a kiln for calcining high magnesium limestone equipped with an integral gas producer. It is connected for hot gas recirculation to secondary air duct, gas duct and producer, which also obtains its air preheated through the lime kiln cooler. The draft fan obtains gases which were for preheating from the top of the storage zone and also directly from the offtake pipe. This kiln is equipped with an automatic continuous system of lime drawing which creates a constant flow of lime through the kiln, rearranging the particles and exposing new surfaces to heat. High calcium kilns do not have a definite 1000 deg. F. zone but hot gas withdrawal and recirculation, as in Fig. 24, is also desirable and is made practicable by drawing all of the producer air through the hot gas offtake pipe, recirculating part of the gas to the kiln and blowing the gas producer with a very hot mixture of very high CO₂ gas.

Fig. 25 is an arrangement for plants using natural gas, the supply of which may be interrupted for periods of several days or more. The kilns are equipped to use natural gas through the center burner and at the same time, or alternately, fire solid fuels in semi-gas producers connected to the kiln shaft through the side burners. When natural gas is not available, the center burner serves as a pier to aid trimming of lime in the hot zone and it remains ready to receive gas immediately when again available.

Proper shaft height varies with the stone size; an ordinary kiln of about

35 ft. active height of shaft would be about right for 6-in. stone but all wrong for 2-in. stone. When stone size is likely to vary, kilns must have two waste gas offtakes, as shown in Fig. 26, one for small stone, another located much higher for large stone. As stone and lime size and resistance may dictate gas withdrawal, this could be regulated to a portion withdrawn through the lower offtake and only a sufficient amount passed to the upper to assure free preheating.

Kilns for Various Stone Sizes

Fig. 27 shows a kiln arranged exclusively for burning spalls. The hot zone and the cooler of this kiln are low, and the center burner is a special split design which is supplemented with a side burner on a higher level for two-level burning. The kiln is drawn continuously by mechanical means, and air is forced into the cooler to overcome its high bed resistance. There are also arrangements for hot gas recirculation. The offtake pipe draws some of the gas through the storage zone for initial drying and mild preheating.

Fig. 28 is a simple mixed feed design kiln. It has low capacity and is not very satisfactory with respect to lime quality. Fig. 29 is an improved type induced draft, mixed feed kiln. There are many of these kilns in operation, particularly in sugar and soda plants. They have a fair capacity and are efficient when care is taken in charging stone and coke and in drawing lime.

The most simple Azbe type forced draft, mixed feed kiln is shown in Fig. 30. It calls for high forced draft and intermittent but rapid drawing of lime. The top of the kiln is under mild positive pressure, thus assuring high CO₂ concentration. Charging is in layers through a special double

section bell guided rigidly in its up and down stroke. Fig. 31 shows a recirculating system applied to mixed feed kilns. In case of mixed feed firing with coke, often due to too high temperatures, very poor lime is obtained, particularly when stone is impure. This can be corrected through hot gas recirculation when waste gases tempered with air are withdrawn above the calcining zone and re-injected below. Sufficient air for cooling of lime still enters through the cooler but otherwise the operation remains the same. Injection of hot gases and secondary air can be either through a center burner type structure or at high velocity for deep penetration through side openings.

Mixed feed firing of lime kilns has many advantages, but coke or anthracite is needed for fuel when coal is used; the volatile gases escape and are wasted and they pollute the surrounding area with acrid smoke. Fig. 32, developed to overcome these objections, incorporates a distillation zone into the kiln from which the gas is piped and injected through a center burner, and it is burned, as in other standard types of kilns. Part of the waste gases from calcining is used to supply the heat required in the distillation zone. These waste gases mix with the volatile products but the mixture is still high in heat value and much higher than producer gas. With this system, it is possible to wash the gases of tar for separate sale and use the remaining gas for any other purpose desired.

Oil Fired Kiln

In ordinary oil firing of kilns, the oil is injected in a relatively coarsely broken up state by mechanical means or by air and steam and it only vaporizes and gasifies in the kiln. Under this system, Fig. 33, the oil enters the

(Continued on page 92)

Sand Separation

Types of Vibrating Screens

A study of vibrating mechanism and screening action

By NATHAN C. ROCKWOOD

IT IS APPARENT from the previous article of this series, in the April issue, that vibrating screens are playing an important role in sand sizing; and apparently as the art of using this type of screen advances, along with mechanical improvements in the screens themselves, we shall use them more and more in sizing or grading sand to specification limits, either in place of, or supplementary to, hydraulic separation devices.

The art of using vibrating screens to the best advantage in making size separations in the finer meshes is new; and the average plant operator is sometimes not familiar with fundamental factors which greatly affect the cost and efficiency of his screening operation. Thanks to the co-operation of some of the leading authorities on vibrating screen problems, we have gathered a lot of data, which we hope will prove helpful.

As a starter we suggest that the plant operator, who is really interested in getting the most out of his screens, study his operation whenever opportunity affords. He can often do this just by watching them

in action. For example, I recently watched an operation designed to screen dry, coarse sand, or fine gravel, on an arched or bowed deck screen. All the material fed to the screen almost immediately rolled into the gutters at the sides of the screen, and very little of the actual screen surface was in use. The arched-deck screen is designed for damp materials, which do not spread readily on a flat deck. It was never intended for bone-dry material.

That illustration may seem obvious, but this operator was experienced; he knew something was wrong; he hadn't bought the screens for that particular job; he had used some he had; and probably to him a "vibrating screen" is a vibrating screen, and that was the end of it. As this series of articles develops we shall try to illustrate other and less obvious ways in which the fundamentals of good screening practice are violated in many plants. For in-

stead of being the simple process it appears to be, correct and efficient use of vibrating screens involves several complex factors.

Kinds of Vibration

Before we describe the details or particulars of any make of screen, we shall classify them according to the kind of vibrating mechanism. Of these there are four, which vary in the method of imparting the vibration to the screen rather than in the kind of vibration, although this latter is an important part of the usual sales argument.

The first mention we have been able to find of a mechanically shaken screen is in "John Smeaton's Diary of his Journey to the Low Countries" in 1755. (John Smeaton, as some readers may recall, was the English civil engineer who built the famous Eddystone lighthouse, and was the first Englishman to discover the secret of hydraulic cements.) At Rotterdam, Netherlands, he found the Dutch pulverizing terras, or trass, in stamp mills, with screens in closed circuit. He called them sieves. By a

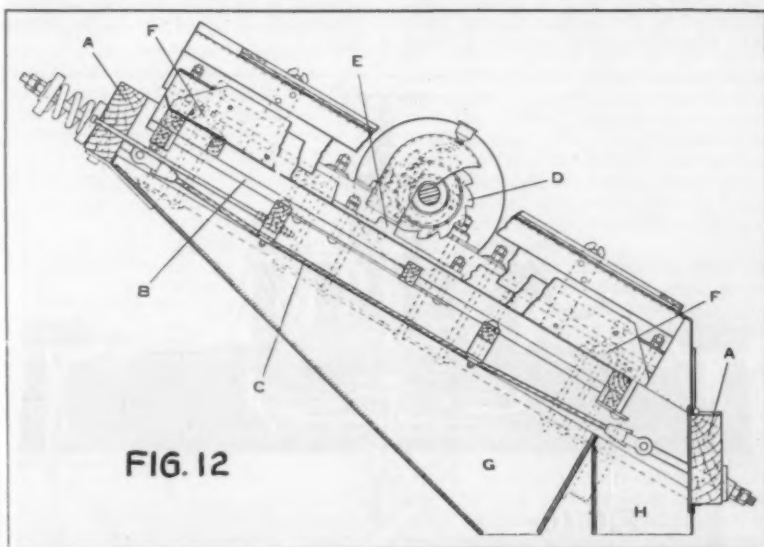


Fig. 12: A is fixed screen support; B is screen frame; C are wire cables on which screen frame rests; D is multiple cam, which in revolving hits cam-plate or anvil E; F are corner steps to check the up-spring of screen after being depressed by cam teeth; G is hopper for throughs; H for oversize—Colorado Iron Works impact screen

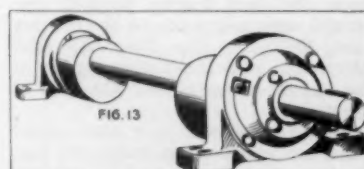


Fig. 13: Example of drive shaft with off-center weights for vibrating screen frame on which the shaft is mounted—Universal Vibrating Screen Co.

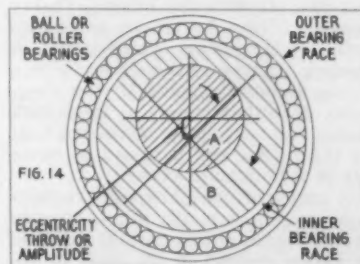


Fig. 14: General principle of the "positive throw" type of vibrating mechanism: A is drive shaft; B is off-center part of shaft, or ring or disk which carries bearings. The outer race is on the screen body

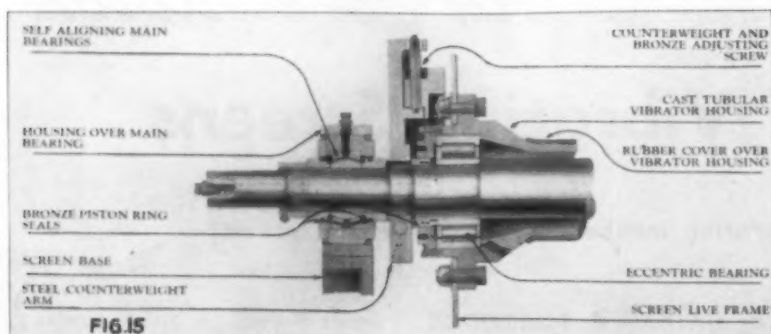


Fig. 15: Example of vibrating mechanism of a positive throw type screen. Made by Robins Conveying Belt Co., and known as the Gyrex screen

cord tied to the stampers, the head end of the screen was raised 5 or 6 inches when the stamper went up, and dropped back on the sills with a jog, when the stamper came down. The screen was hinged near the lower end, and was inclined at an angle. The undersized material dropped into a hopper below the screen and the oversize was shoveled back into the stamp mill.

That is worth recording here because it shows that the fundamental idea of a vibrating screen, as well as the advantages of closed circuit grinding, were known in Europe 200 years ago. The first attempts at vibrating screens in this country, not much over 50 years ago, if even that long, were various devices for shaking or vibrating the screen deck by impact with hammers, tappets or cams. Screens of this type, much improved mechanically of course, and with much higher frequency of vibration, are manufactured today. Perhaps the best known modern examples are those made by the Sturtevant Mill Co., the Colorado Iron Works Co. and the Leahy screen of the Deister Concentrator Co. Fig. 12 shows one.

Vibrating screens are also called pulsating screens, and before we had vibrating screens we had shaker screens. The shaker screen apparently becomes a vibrating screen when it is shaken fast enough (somewhere around 1200 r.p.m.). This was not possible with the original shaker screens driven by simple eccentrics with reciprocating connections. A modern version of the shaker screen is the Hendrick, made by the Hendrick Manufacturing Co. It is high speed for the shaker type, running at 450 r.p.m., and designed to operate in a horizontal plane.

A study of the horizontal shaker-type screen is worth while because the operation makes obvious the kind of action desired in all types of vibrating or pulsating screens. The action is to lift the material up, throw it forward, pull the screen surface back and drop the particles down where the undersize can go

through the meshes. In screens having mechanical vibrating devices directly on the screen frame, the vibratory motion of the screening surface, and hence of the particles to be screened, is circular or oval, and the screen has to be mounted on an incline to insure travel of the material along the screen. There are mechanical and also electro-magnetic vibrating devices which impart a horizontal vibration, or impulse, and will actually screen uphill.

Off-Center Weights

The first and simplest of the vibrating screens is vibrated merely by an off-center shaft, or a shaft with off-center weights. When such a shaft is revolved rapidly, obviously it will "shiver" or vibrate whatever it is attached to. Hence, when rigidly attached to the sides of a screen frame, it will vibrate the screen. The first and simplest one we ever saw was a wooden box, one side open at the lower end, with a screen cloth fastened to the bottom. About half-way down the screen box was a plank

with a solid steel shaft, off-center between bearings, driven by a belt and pulley. The whole was mounted on wagon springs, top and bottom.

Modern variations of this simple device usually have off-center or weighted flywheels to set up the vibration, with a designed amount of throw, or amplitude. In some the amplitude may be changed by changing the position of the flywheel weights. The r.p.m., or the frequency of the impulses, can be changed, of course, with a variable-speed motor, or different sizes of pulleys. The drive shaft and pulley of course vibrate with the screen. The vibration of the screen is transmitted to the screen-supporting structure and must be absorbed by springs or similar means. The Universal of the Universal Vibrating Screen Co. and the Aero-Vibe screen of the Allis-Chalmers Manufacturing Co. are examples of this type of screen. Fig. 13 shows a typical vibrating mechanism.

This kind of vibrating mechanism is also used "in tandem"; that is, one off-center shaft or weighted flywheel in front of the other, both turning at the same speed, or at such different speeds as designed to give the desired impulse, but adjustable so that the amplitude may be the sum of the two, or some other component. Such a vibrator is used on the Robins Eliplex and the Allis-Chalmers Low Head Horizontal. The kind of vibration transmitted to the screen frame would vary, both with the relative positions, rates of revolution, and weights of the two revolving shafts or weights, and with the angle at which the mechanism is attached to the screen body. Usually a forward inclined elliptical movement is called for in the screen itself.

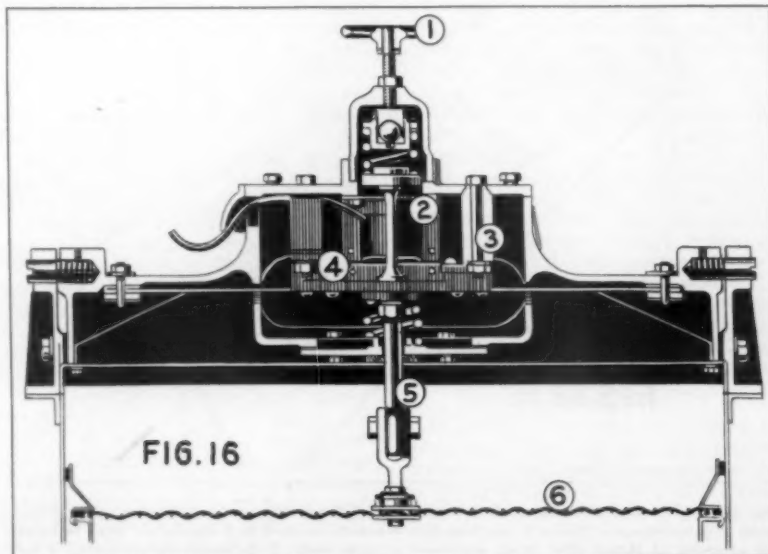


Fig. 16: Electro-magnetic vibrating mechanism of Hummer screen

SAND SEPARATION

"Positive-Throw" Type

The next type of mechanically vibrated screen is what is known as the "positive throw" type. This is to distinguish it from the type just described, for theoretically at least, the amplitude of vibration of the screen vibrated by an off-center shaft or weights would decrease as the load on the screen deck increases. Actually, however, the "throw" is made so powerful that the deck load on the screen is usually only a fraction of it. However, the positive throw type has no such handicap, real or imaginary.

In the positive throw type the screen body itself takes the place of the off-center weights; it rides up and down, or around the circle, on eccentric bearings. The underlying principle is shown in Fig. 14. Thus the whole screen has an orbit or a vibratory movement with an amplitude equal to the eccentricity of the shaft or rings that carry the bearings on which the screen body rides. Counterweights are employed either as a part of the drive shaft, or as unbalanced flywheels on the ends of the shaft, to absorb the vibration of the screen body. In other words, when the screen body is going up, the counterweights are going down. The drive shaft and pulley, gears or motor are not vibrated but are on a firm supporting structure.

Ordinarily this type of screen has a fixed amplitude of vibration which should be suitable for the particular screening job it is to do, but at least one manufacturer, the Productive Equipment Corporation, has an ingenious device for changing the amplitude of its "Selectro" screen. Screens of this type are the most numerous and are made by nearly all the screen manufacturers. These screens have ball or roller bearings of the highest quality, because severe service is required of these bearings; hence this type of screen is more expensive than

the unbalanced weight type. Fig. 15 is a typical example of the vibrating mechanism.

There is one notable variation of this general type and that is the Symons Type F screen of the Nordberg Manufacturing Co. While this uses the same type of vibrating mechanism as the other "positive throw" types, the vibrating device is at one end of the screen frame and the vibratory motion is transmitted to it horizontally by means of rigidly attached, flexible, laminated bars. This gives truly reciprocating, horizontal impulses, like those of a shaker screen, but at vibrating screen speeds and much smaller amplitudes, and without the use of rocker bearings of any kind. Inclined spring supports take the place of such bearings.

Electric Vibrators

There are three well-known screens on the market whose vibrating mechanisms depend on electrical magnets and moving armatures. In the Hummer screen of W. S. Tyler Co., the screen cloth is held at drum-head tension and the reciprocating armature is attached to the screen surface itself not far from the center, flexing it with every cycle. The upward stroke of the armature is interrupted by an anvil or striking block, designed to free the meshes from particles tending to blind them. The 400 Type Hummer has vibrators at all four corners, which vibrate the screen frame in unison, or in other words the vibrators are synchronized.

The Jeffrey-Traylor electric vibrator of the Jeffrey Manufacturing Co. pulls back an armature, attached by a center clamp to a bundle of vibrator (spring) bars. The same center clamp is also attached rigidly to the screen body. Thus, as the armature is pulled back by the magnet it flexes the vibrator bar springs. When the magnetic coil releases the pull, the vibrator bars snap back for another pull. The coil impulses are tuned to the vibrations of the spring bars. Through the center clamp and connections, the whole screen body moves or vibrates with the armature and spring bars.

The vibrating mechanism may be so attached to the screen body as to vibrate it in almost any direction, but usually is placed at such an angle as to give a slightly upward vibration on an inclined screen; or in some cases perpendicular to the screen surface. The screen may have more than one vibrator if required.

The Utah Electro-Magnetic screen of the Allis-Chalmers Manufacturing Co. has two opposite magnetic coils or poles with a straight-line reciprocating armature mounted between the two pole pieces. The special alternating or fluctuating electric current goes from one pole to the other at proper intervals to vibrate

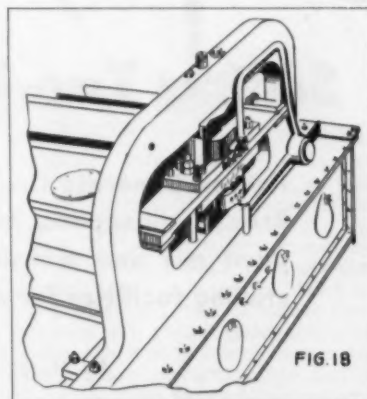


Fig. 18: Electro-magnetic vibrating mechanism of Allis-Chalmers Utah screen

the armature and the screen body which is rigidly attached to it. One or more vibrators are attached to each side of the screen and their vibrations are synchronized.

All of the electrically vibrated screens require special devices for supplying the kind of electric current necessary. They have the advantage that by manipulating the current the amplitudes and type of vibration may be varied. The screen vibrations must be absorbed by spring suspensions or otherwise. All are designed primarily for screening fine materials.

Seniority Loss for Absentees

IN A CASE involving the Standard Lime & Stone Co., Strasburg, Va., and the United Cement, Lime and Gypsum Workers' Union, AFL, the Fourth Regional War Labor Board has ordered a policy-making contract provision, calling for loss of seniority and eventual discharge of an employee for repeated absenteeism. It is expected that the provision will have a widespread effect on future labor union contracts. The provision calls for a warning to the employee for the first two-day period of absenteeism, loss of three months' seniority for the second period and discharge for the third such absence during a contract year. To avoid the penalties, an employee must have permission from his foreman or superintendent to be absent, or must report to the office during the absence and give his reasons. Excessive absenteeism for shorter periods than two successive days may be subject to disciplinary action.

Lime Plant Closes

WASHINGTON BRICK & LIME Co., Seattle, Wash., is reported to have closed its Williams, Ore., lime plant due to a lack of labor. The plant has been producing chemical lime for the metallurgical plants in the Pacific Northwest.

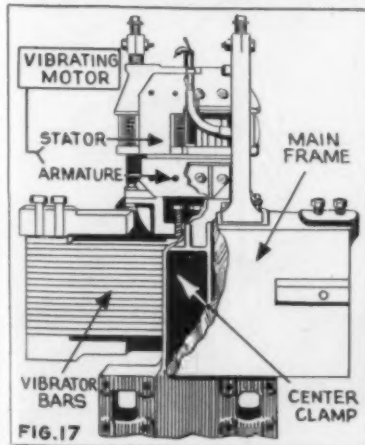


Fig. 17: Electro-magnetic vibrator of the Jeffrey-Traylor screen. The center clamp is attached to screen body

Batching

Selling Two Types of Mix

Heston Concrete Co., division of Shumaker Bros., Indianapolis, Indiana, produces both plant mix and transit mixed concrete. Installing facilities for air-entrained concrete

By H. E. SWANSON

A MODERN and efficient ready mixed concrete operation, which emphasizes quality of product and service to the customer, is the plant of Heston Concrete Co., a division of Shumaker Bros., Indianapolis, Ind. This plant was purchased in January, 1943, by Shumaker Bros., who also own and operate several allied industries in the Indianapolis area, including the State Sand and Gravel Co. The progressiveness of this company is not only evident in the constant attention paid to the production of high grade concrete, but also in their decision to introduce air-entraining concrete to their customers. Customers who are not familiar with the benefits to be derived from air-entraining concrete will be informed and customer reaction to the new ingredient will be noted.

Aggregates are received by truck from local sand and gravel plants owned by this company. The trucks discharge into an underground 10-

ton capacity concrete hopper, which feeds a 30-in. belt conveyor, 264-ft. centers. The aggregate is delivered to a five-compartment Johnson "Octobin," each compartment having a capacity of 25 tons. A swivel chute allows charging the separate compartments.

Batching Plant

Cement is received in bulk cement cars on an adjacent railroad siding and delivered to a 400-bbl. capacity steel silo storage bin by means of a 10-in. screw conveyor, 14 ft. long, which feeds a bucket elevator, 80 ft. high. Cement may be delivered direct to the bin or to a service bin, having a capacity of 150 bbl., located above the weigh batcher in the mixing plant. Another 150-bbl. bin is used for storing high early strength cement. Plans for the near future include a 500-bbl. storage bin for air-entraining cement. Designs for this bin are now being drawn up.

Water from the city water system is delivered to a 200-gal. water tank, equipped with scales. Well water is also used, and two centrifugal pumps are employed for pumping the water to the tank.

Weighed aggregates, cement, and water are discharged either directly from the batcher to transit mixers, or to a 2-cu.yd. Koehring mixer. Discharge for transit mixing is directly below the batcher while discharge from the plant mixer to transit mixers, used in this case as agitators, is at the side of the building.

A fleet of transit mixers is in use at this plant, consisting of 4-cu. yd. Jaegers on Diamond T trucks; 4 cu. yd. Blaw-Knox mixers on Mack trucks; Jaeger high-dump mixers on Internationals; and 6-cu. yd. Rex high-dump on Reos.

The capacity of this plant is about 600 cu. yd. per eight hour day.

In addition, this company operates a portable plant for use on jobs where transportation prohibits the use of concrete made at the main plant. This portable plant is moved



Long conveyor inclining up to the top of five-compartment aggregates bin holding 125 tons. Aggregates are dumped by trucks into 10-ton capacity concrete hopper feeding conveyor. Cement storage silo to the right

to the job site by truck and utilizes a 300-bbl. cement bin, a two-compartment Johnson aggregate bin, capacity 40 tons, a 2-cu.yd. weigh batcher, and an Erie crane for charging the aggregate bin.

Owners of the Heston Concrete Co. are three brothers; H. A. Shumaker, William E. Shumaker and Fred I. Shumaker. Farrell F. Tolen is general manager of the ready mixed concrete operations.



Batching plant to the right with 150-bbl. capacity cement silo to the left



Close-up of batching plant, showing 4-cu. yd. mixer with cable to raise chute out of the way, and one of the latest type mixer trucks

Waste Heat Boiler for Cement Kilns

SEVERAL recent cement plant installations seem to indicate a trend toward the use of waste heat boilers to secure maximum fuel economy. A description and illustrations of the waste heat boiler invented by Carl E. Stromquist should therefore be of general interest to cement plant engineers contemplating modernization or construction of new mills. The boiler has been patented, but has not been placed in production.

Some interesting claims are made for this boiler which has been designed by an engineer who has been long identified with the cement industry. Large concentrations of dust encountered in the utilization of hot gases from cement kilns has been a problem in the efficient operation of waste heat boilers, but the inventor has made provisions in his design to dispose of the dust.

As shown in the illustrations, straight vertical boiler tubes, economizer tubes, and superheater tubes are used to prevent dust from lodging on the tubes, which reduces the effective heating surface and blocks the gas passages between tubes.

Another provision in the design is

a sectional tube header. This is to facilitate the dislodgment of dust from the lower headers and to permit access to the entire area of all tubes by means of lancing apparatus entered between the upper headers.

The design also provides means of inducing rapid water circulation. Water circulation is accelerated by means of downcomer tubes, located outside of the direct gas passage. This provides a rapid equalization of temperature of all surfaces of the boiler corresponding with the developed pressure when quickly subjected to the heat of the incoming gas discharged from the kiln, thus eliminating excessive strain from unequal expansion. It is also said that this eliminates local circulation within each individual vertical steam generating tube, restricting the downward flow of the water.

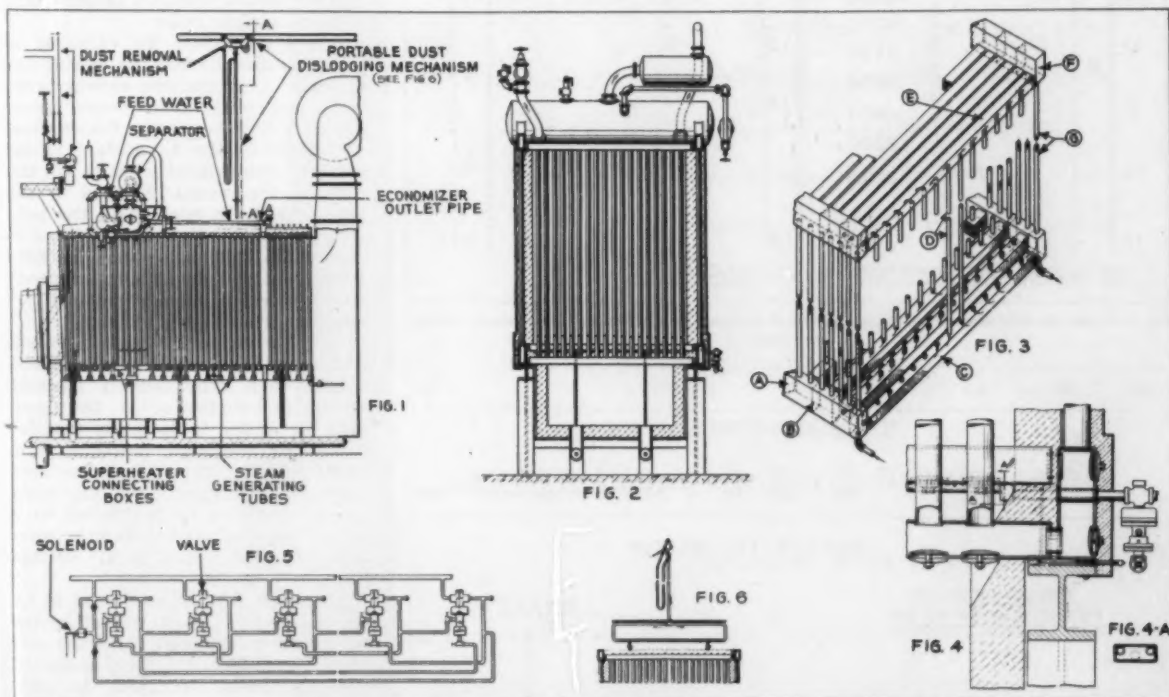
A distinctive feature of the waste heat boiler is the pneumatic system of dislodging the dust. The details of this system, which is actuated intermittently by the shaft of the screw conveyor feeding raw material to the kiln, will be described later.

Fig. 1 shows a rotary cement kiln

supplied pulverized raw material through the usual feed pipe and screw conveyor. Hot dust-laden gases emitted from the kiln enter the front end of the boiler passing between the front banks of steam generating tubes, without the usual intermediate hot dust chamber. Upon striking the cooler banks of boiler tubes, the dust is quickly reduced in temperature and arrested in motion, dropping down between the sectional headers of the boiler and into the dust chamber. The dust has been cooled to such a degree that the dust removal screw conveyors are not subjected to excessive temperature. Removable cast iron or refractory baffles in the dust chamber prevent the gases from bypassing the banks of tubes. The dust chamber has vertical side walls preventing any tendency of the dust to hang up over screw conveyor openings.

To provide an opening for the kiln raw feed pipe and the manhole frames, three or more upper headers of the boiler are in two sections and shortened. Likewise, three or more rows of the steam generating tubes

(Continued on page 94)



Waste heat boiler for cement kilns. Fig. 1: Longitudinal vertical view of the boiler, showing electrical contact mechanism for pneumatic dust blowing equipment located below lower boiler headers. Above boiler, to the right (A-A) is shown the portable dust blowing mechanism. Fig. 2: Transverse vertical section of boiler. Fig. 3: Isometric view, showing water and steam circulation. Fig. 4: Diagram showing pneumatic dust blowing apparatus. Fig. 5: Close-up details of dust blowing mechanism located between steam generating pipes; valve shown to the right. Fig. 6: Portable dust blowing mechanism

Charts Reduce Laboratory Calculations

By C. J. KNICKERBOCKER

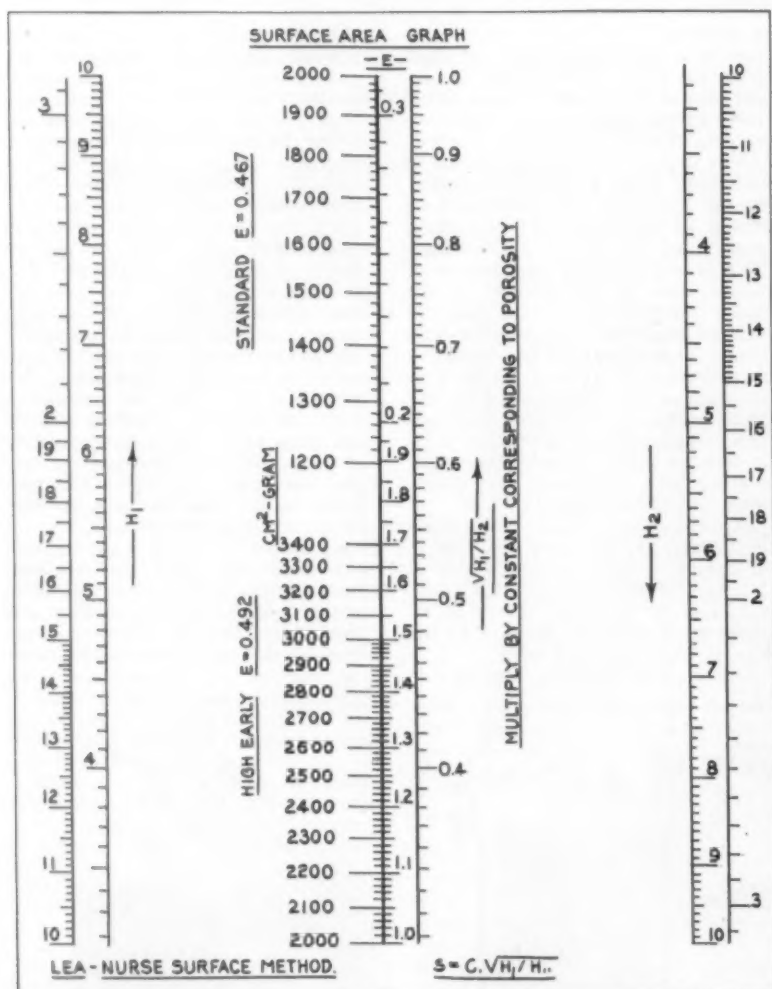


Fig. 5: Graph converts Bowen fineness meter manometer readings into Wagner turbidimeter surface area units

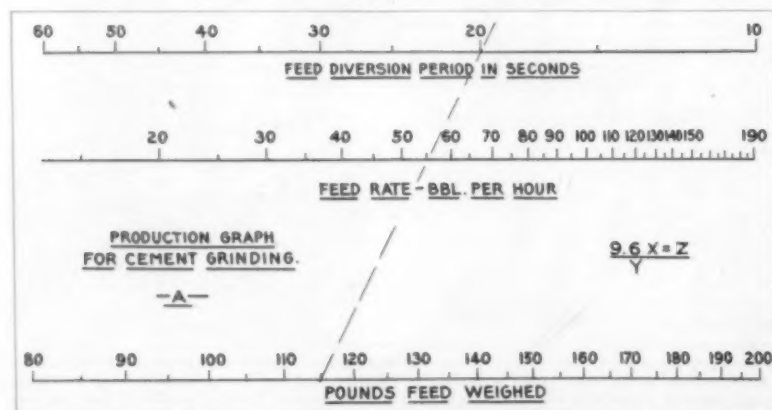


Fig. 6: Chart "A" is used to determine production rate when weighing mill feeds for time intervals

TO CONVERT Bowen Fineness Meter manometer readings into Wagner turbidimeter surface area units when the sample of cement is tested under prescribed conditions, the graph shown in Fig. 5 is used.

The conversion of Lea-Nurse air permeability values into the standard Wagner terms is secured by the use of constant factor for each type of cement. The constants vary for different air surface meters and turbidimeters and their operational technique, and the evaluation of the constants requires that a large number of samples be analyzed for each cement type, fineness range and grinding method. Correlation is more readily established for cements produced by grinding methods that are of a fixed nature.

Specifically, during a high-early-strength grinding operation, rigid control may be enforced in respect to clinker feed size, clinker temperature, clinker grindability and rate of production, with resulting uniform grinding temperatures, interior mill conditioning, size distribution of product and a constant Lea-Nurse-Wagner surface ratio.

When conditions do vary, as is often possible during the production of Type 1, production requirements being less restricted by quality specifications, the change is reflected most noticeably by the air surface values and the subsequent change in the ratio of the results obtained by the two systems. In such cases the porosity of the sample may be varied to reestablish the ratio, using the 325-mesh sieve residue as a guide, moderate success being realized in a restricted surface area range.

Once the air surface sample weight and porosity is established that will satisfy each type cement (specific gravity and surface area), the graph may be utilized to facilitate calculations. The left hand, center solution line reads in converted surface area units and the right hand line gives values that may be multiplied by a factor peculiar to the sample analyzed to yield results in air surface units.

The surface area, expressed in sq. cm./g., as directly determined by the air permeability method is the criterion by which grinding operation changes should be made to fully realize the advantages of the effective fineness of the product.

Plants not having weight clinker feeders may resort to weighing mill feeds for timed intervals in order

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ROCK PRODUCTS, May, 1945

to determine the production rate. Chart "A" may be used for the calculation.

Feed rate variations during the grinding of cements receiving fixed percentages of added materials, result in required changes in feed rate or amounts of addition material. Chart "B" may be used in such cases. Both charts may be mounted in the grinding room for the convenience of the operator responsible for maintaining the fixed addition content.

Illustrated examples follow:

"A"—A 20-second feed diversion weighs 115 lbs.

$115 \times 3 \times 60/376$ equals 55 bbl. per hour.

"B"—A product produced at the rate of 55 bbl. per hour is to contain 0.035 percent additional material.

$(55 \times 376/60) \times 0.00035$ equals 0.12 lb. per min., or 54 gms. per min.

Hydrated Calcium Silico-Aluminates

NATIONAL BUREAU OF STANDARDS has continued its investigation of complex calcium aluminate salts which may be constituents of hydrated portland cement. This investigation followed the discovery of the garnet-hydrogarnet series of compounds I.J. Research NBS 26, 13 (January, 1941, RP1355).

In the Journal of Research for December, E. P. Flint and Lansing S. Wells describe the preparation of three new complex hydrated aluminates, as follows: (1) A low-silica calcium silicoaluminate, $3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{CaSiO}_3 \cdot 12\text{H}_2\text{O}$; (2) a high-silica calcium silicoaluminate of probable formula, $3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{CaSiO}_3 \cdot 30\text{H}_2\text{O}$; and (3) a hexacalcium aluminate, $3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{Ca}(\text{OH})_2 \cdot 30\text{H}_2\text{O}$.

The first of these compounds is closely related to the low-sulfate calcium silicoaluminate, $3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{CaSO}_4 \cdot 12\text{H}_2\text{O}$, which may be formed during the setting of portland cement. The other two compounds are very similar to the high-sulfate calcium silicoaluminate, $3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{CaSO}_4 \cdot 31\text{H}_2\text{O}$, which is known to be a constituent of hydrated portland cement. Crystals of the high-silica silicoaluminate were identified in mixtures of the following cement compounds which had stood in contact with approximately saturated lime solution for 3 years: $\beta\text{-}2\text{CaO} \cdot \text{SiO}_2$ and $4\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3$, $\beta\text{-}2\text{CaO} \cdot \text{SiO}_2$ and $3\text{CaO} \cdot \text{Al}_2\text{O}_3$, and $3\text{CaO} \cdot \text{SiO}_2$ and $4\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3$. The low-silica silicoaluminate, on standing in contact with lime solution, is slowly transformed to the high-silica compound, and this behavior is analogous to that of the two forms of calcium silicoaluminate.

The hydrated hexacalcium aluminate, $3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{Ca}(\text{OH})_2 \cdot 30\text{H}_2\text{O}$, probably does not occur as a direct hydration product of portland cement but might form, under certain conditions, as a solid solution in the high-sulfate form of calcium silicoaluminate.

Cement Production

BUREAU OF MINES reports that production of finished portland cement during February, 1945, totaled 5,371,000 bbl. or 6 percent below production in February, 1944. Production in February, 1945, as in the previous month, was greater than demand and 797,000 bbl. entered stocks. Shipments from mills during February dropped to 4,574,000 bbl., a decline of 10 percent from the mill movement in February, 1944. Mill stocks of finished cement at the end of February totaled 22,164,000 bbl., a decline of 12 percent from the stocks of the corresponding month of 1944. However, the February total represents a continuation of the upswing in stocks, which began in November, 1944, and follows very closely the trend of the 1935-1939 averages.

The following statement gives the relation of production to capacity, and is compared with the estimated capacity at the close of February, 1945, and of February, 1944:

	RATIO (PERCENT) OF PRODUCTION TO CAPACITY				
	Feb. 1944	Feb. 1945	Jan. 1945	Dec. 1944	Nov. 1944
The month..	29.0	29.0	31.0	36.0	42.0
12 months ..	49.0	37.0	37.0	37.0	38.0

Cleveland Labor Scarcity

MANUFACTURERS of concrete block, ready mixed concrete and other building materials in Cleveland, Ohio, have been advised that due to labor losses to the draft and the scarcity of labor in this area that the War Manpower Commission would designate these activities "locally needed."

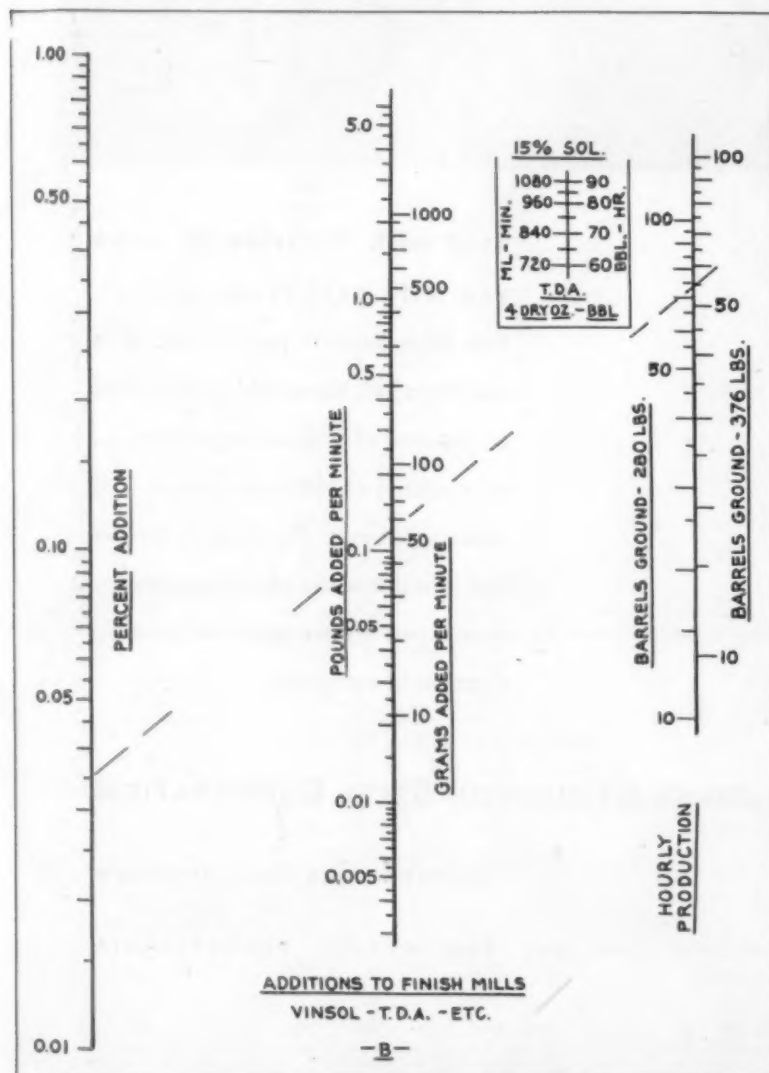


Fig. 7: Chart "B" is used when there are feed rate variations during the grinding of cements receiving fixed percentages of added materials



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Canada Recognizes the Importance of Industrial Minerals



Victor J. Azbe

INDUSTRIAL MINERALS are gaining increased recognition in Canada among mining men and we may anticipate considerable exploratory work and development of deposits and processing in future years. That was our impression in attending the 49th annual general session of the Canadian Institute of Mining and Metallurgy on April 17-19. The meetings were held in Quebec City at the world-famous Chateau Frontenac, scene of one of the historic Roosevelt-Churchill war conferences.

The attendance of over 500 delegates was predominantly of metals producers but two entire sessions were devoted to papers and discussion on industrial minerals. There was a good turnout of lime producers, in particular, attracted by a paper on the "Economical Manufacture of Quality Lime" by Victor J. Azbe, consulting engineer and contributing editor of *Rock Products*. Among prominent guests from the United States, at the industrial minerals meetings besides Mr. Azbe, were Walter Stauffer, president of the National Lime Association; Oliver Bowles, U. S. Bureau of Mines; Harlowe Harding, president of the Hardinge Co.; and L. Bryant of the Hawaiian Gas Products Co., Honolulu.

M. F. Goudge, mining engineer, Industrial Minerals Division, Bureau of Mines, Ottawa, and J. H. Robinson, Gypsum, Lime and Alabastine, Canada, Ltd., Toronto, were co-chair-

men of the opening session on industrial minerals.

Lime Manufacture

Mr. Azbe's paper was prepared in the form of a booklet for presentation to the lime industry and summarized technical developments in the manufacture of lime based on his 25 years as a consultant for 100 lime plants. Much of it was highly technical with prolific use of graphs, charts and engineering design drawings, covering all phases of lime manufacture, including shaft kilns and rotary kiln plants and hydrators.

In the time allotted, Mr. Azbe merely touched upon the highlights of each chapter and copies of the booklet were distributed to those interested. In his opening remarks, from the introductory chapter, he stressed the importance of lime in all its applications and stated that developments in lime burning have required a quarter of a century of study to reach the stage wherein the process can now be termed as in the realm of chemical engineering. The lime producer of today, if given proper stone, can produce any kind of lime required by industry's chemists, he said.

In one chapter, "Lime Kiln Energy Streams," Mr. Azbe went into detail on lime kiln thermal efficiency, discussing heat losses due to incomplete combustion, excess air, latent heat, improper coolers, etc., and in another he thoroughly covered the subject, heat of preheating dissociation. Several chapters followed on the subject of lime kiln fuel efficiency, with all calculations and deductions based upon available heat. He discussed the fallacies in calculating efficiency when wood is the fuel and methods for gaining high efficiency with various fuels.

Other chapters covered the effect of magnesia, silica, alumina and iron on lime kiln fuel ratios, the effect of incomplete combustion and excess air, the instrumental gauging of kiln

efficiency, factors controlling gas flow and heat transfer, surface available with stone of various sizes and shapes, factors controlling gas flow and heat transfer, resistance to gas flow and pressures required, gas volumes required, heat to be transferred, the effect of chemical composition on dissociation and other phases of the combustion process. Of particular interest was his discussion of the idle zones in kilns between the calcination and preheating zones, which may represent up to 50 percent of the total vertical kiln height wherein no useful work is accomplished.

In commenting on the evolution of the high capacity shaft kiln, Mr. Azbe said the old kilns produced about 500 lb. of lime per sq. ft. of shaft area as contrasted to 3000 lb. in the best of newer kilns installed. The limiting factor on capacity is not a matter of heat transfer but of draft, which quadruples for every doubling of capacity.

Then followed a series of chapters on particular modern installations, with all pertinent operating data, and a discussion of the Azbe system of controlled calcination, his system for fuel oil firing, recent wood-burning installations and comparisons of performance with shaft kilns and rotary kilns. An entire chapter was devoted to the calcination of small size stone down to $\frac{3}{4}$ - to $1\frac{1}{2}$ -in. size at high capacity rates in vertical kilns. Concluding chapters discussed hydration and described new developments in hydration machinery.

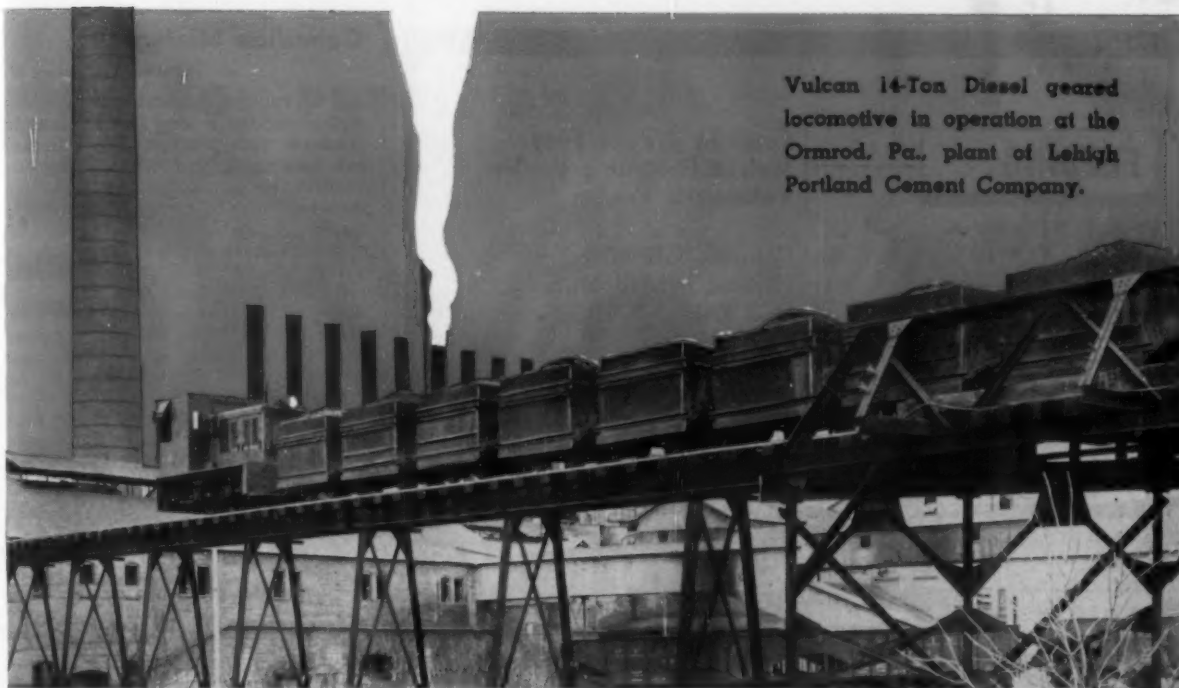
The foregoing is only a summary of the subjects covered in a book of 88 pp., exclusive of graphs and charts. More of the details will be published in forthcoming issues of *Rock Products*.

Ceramics

In a paper entitled "Ceramics and Industrial Minerals," W. G. WORCESTER, Saskatoon, discussed the wide

(Continued on page 86)

Vulcan 14-Ton Diesel geared locomotive in operation at the Ormrod, Pa., plant of Lehigh Portland Cement Company.

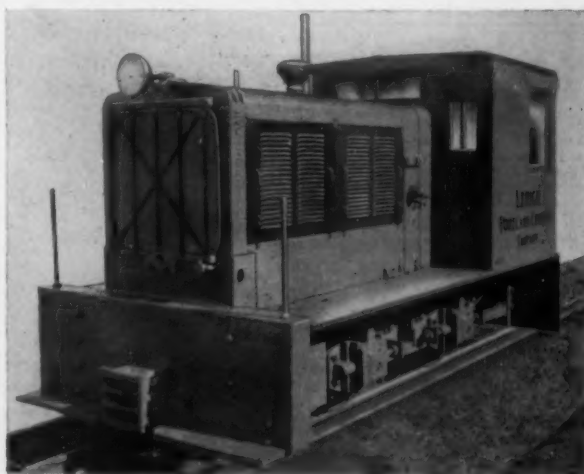


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Much of the credit for this money-saving record must go to the competent executives who have been responsible for its operation and maintenance, but back of it all are the ample margins of strength and power for which Vulcan locomotives have always been noted and which have made them the choice of many other great industrial organizations for over half a century.

More and better Vulcan locomotives are being built today than ever before—steam, gasoline, Diesel and Diesel-Electric—from 6 to 100 tons in weight—wide or narrow gauge. Deliveries are still subject to approval of the War Production Board but inquiries are cordially invited and will be given the fullest possible benefit of whatever priority can be secured.



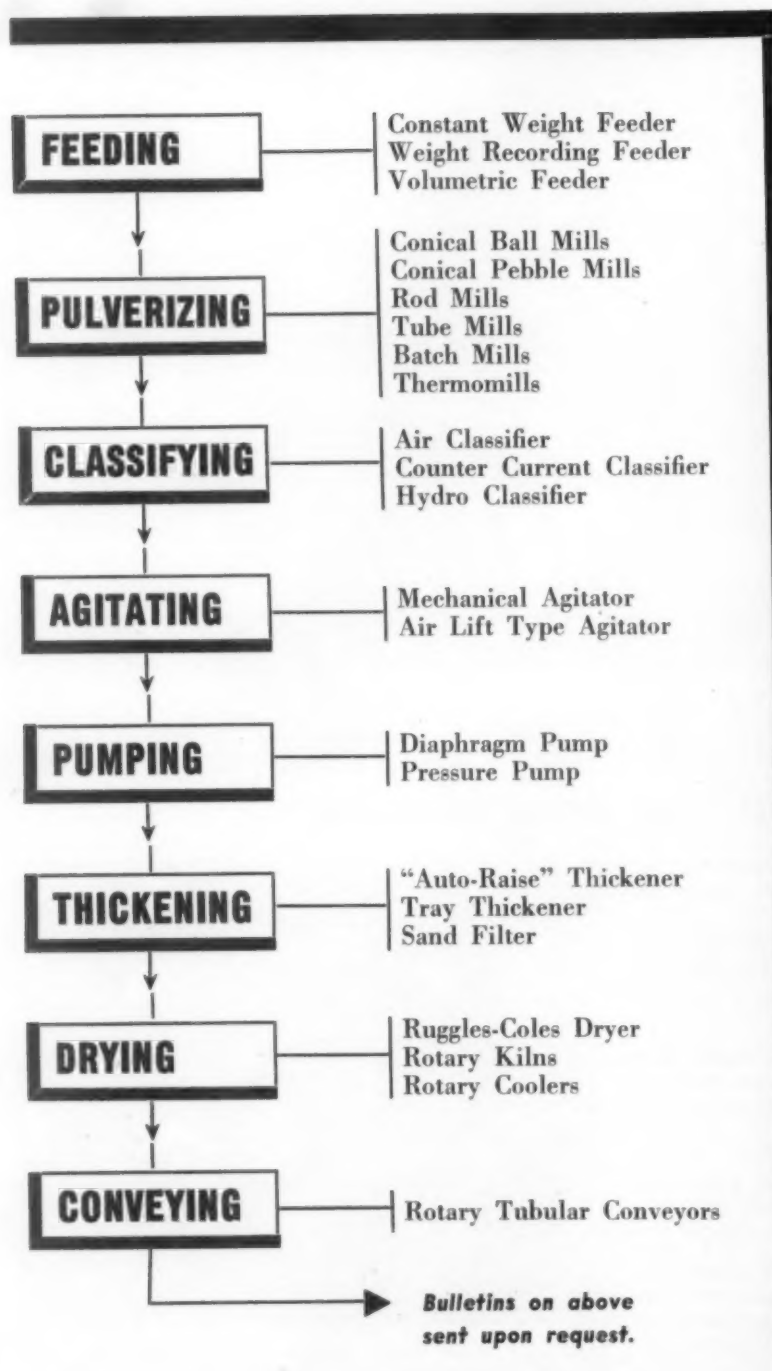
Close-up of 14-Ton Vulcan locomotive shown in operation above. Equipped with 6-cylinder Caterpillar Diesel engine rated 145 hp. at 1000 r.p.m. and Constant-Mesh Four-Speed Spur-Gear Transmission which not only facilitates speed-changing but also eliminates all possibility of gear-stripping.

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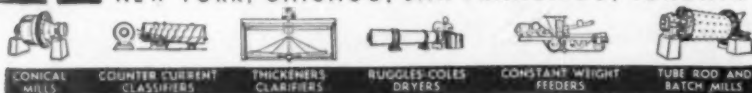
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Electric Locomotives and Larrys	Automatic Quick-Lime Hydrators	Shaking-Chute and Chain Conveyors	Cast-Steel Sheaves and Gears



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Canadian Mining

(Continued from page 84)

use of various minerals in ceramics and presented a long list of ceramic products with the industrial mineral raw materials required in their manufacture, to emphasize that the ceramics industries comprise a sizeable outlet for industrial minerals. The ceramics industries produce products valued at over \$600,000,000 annually on this continent, he said. Mr. Worcester urged that action be taken to stimulate and encourage prospecting to discover ceramic raw materials which are not known to occur in Canada. In concluding, he suggested that some of the returned young men of former university training should be given a special course to fit them for field work and prospecting wholly for industrial minerals.

Sources of Aluminum

DR. E. C. HARDER, Montreal, in discussing "Canadian Sources of Aluminum," told of investigations over the world for new sources of aluminum and suggested that it may become necessary to work very low grades of raw materials. He briefly mentioned new processes of extraction that have been developed. In view of the large tonnages of raw materials to be processed with low grade sources, Dr. Harder said that it is likely that bauxite sources will be used up before extensive exploitation of low grade sources will be done.

However, he did stress that the processing of low grade materials may yield by-products of sufficient value to justify processing. In this regard he mentioned the pilot plant for the production of alumina from anorthosite adjacent to the Laramie, Wyo., plant of the Monolith Portland Midwest Co. The by-product, dicalcium silicate, is to be used in the manufacture of portland cement.

Silica from Sand

PAUL BOURRET, Quebec, and N. B. DAVIS, Ottawa, were co-chairmen of the second session, on the subjects of sands and asbestos. An impromptu talk, entitled "Recovery of Silica from Sand," by J. M. CUMMINGS, Department of Mines, Victoria, B. C., reported work accomplished on the beneficiation of beach sands and bank sands by flotation in the production of refractory, foundry sands.

Very promising results have been obtained in pilot plant work on bank sands using two stages of flotation with cationic reagents. Some of the sands in British Columbia contain 20 to 40 percent feldspar and seven or eight other minerals besides quartz, including orthoclase and various rock fragments, some of igneous origin. Basically, the process used, in sands containing as little as 15 to 45 percent quartz, is to float a quartz-feld-

(Continued on page 88)

HOW YOU PROFIT BY



Pre-Engineering

● Here's a *factory-built* conveyor system that will fit your *custom-built* plant completely!

No special engineering. No delay for estimates on cost. No weeks of waiting for factory fabrication. Barber-Greene Conveyors are pre-engineered—pre-fabricated!

B-G Conveyors are built in a variety of sizes, forms and capacities, that they'll meet any material handling requirement . . . can be installed anywhere.

Erection costs? Your own workmen can install a B-G Conveyor system quickly, easily. Units arrive on the job conveniently marked. Factory assembled terminals and standardized units simplify and speed erection.

Barber-Greene Conveyors are *standardized*. You can make additions and alterations rapidly . . . move it to a new location with 100% salvage. Factory assembly assures correct alignment in erection—reduces belt wear and maintenance expense. Write for Catalog 76. Barber-Greene Company, Aurora, Illinois.

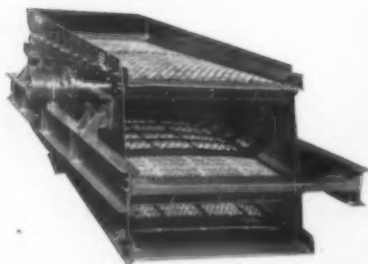
Barber-Greene  *Constant Flow Equipment*



Simplicity
**GYRATING
SCREENS**

MEASURE IT'S VALUE

FEATURE BY FEATURE



The Superior value of Simplicity Gyration Screens shows itself by their outstanding individual features. These features are the reason why user after user reports that Simplicity Gyration Screens make cleaner separations to closer tolerances with very little upkeep. Here are some of the outstanding Simplicity features . . .

✓ **Rubber-Cushioned Power**—Resilient rubber mountings support screen corners so all positive gyrating action is imparted to screen decks. This eliminates excessive structural wear, increases screening efficiency.

✓ **Screen Cloth Whip Eliminated**—Screen cloth is stretched taut all four ways over bars which are crowned both sideways and endways. Screen cloths last longer. Screening efficiency is increased because screens cut more cleanly through material, remove under-size more positively and eliminates blinding.

✓ **Adjustable Angle**—Setting can be changed as much as ten degrees by simple corner adjustment which does not shift the I-Beams. Each successive deck is set $2\frac{1}{2}$ degrees steeper than one above to aid the smaller oversize particles in

moving down against counterflow screening action.

✓ **Heavy-duty Bearings**—The complete gyrating assembly is carried by heavy duty ball or roller bearings in dust-proof and water-proof housings protected by special labyrinth bronze seals.

✓ **Concentrated Screening Force**—Counterbalanced eccentric shaft—original with Simplicity—is machined directly on the shaft and exactly balances the weight of the entire vibrating screen deck assembly. This "builds-in" positive action with perfect smoothness.

✓ **Durable Construction**—Heavy I-Beam frame is tied together with rigid steel channels, sturdy, all-steel constructions permits larger capacity with minimum of repairs.

Simplicity
ENGINEERING COMPANY • DURAND, MICH.

Canadian Mining

(Continued from page 86)

spar concentrate in one operation and then float off the feldspar in a second operation.

One of the complicating factors in the process is that the mineral surfaces in bank deposits are not necessarily fresh, having been subject to various exposures to solutions or covered with slimes. It was necessary to clean the surfaces. Acid leaching was found too expensive but a process of de-sliming after agitation (tumbling) for about ten minutes was found effective with the exception of one sand tested. Cost was the governing factor in this experimental work and long chain amine reagents were made standard.

It was found that the presence of even a small amount of slimes consumed reagents rapidly and that the addition of a small amount of fuel oil helped reduce this waste. However, the addition of too much fuel oil cut down selectivity and caused interference with the process of flotation. With the amine reagents and pine oil frother, the flotation of the feldspar and quartz from the rest of the sand constituents was very rapid, proving that great capacity could be achieved from small equipment.

In the second stage, hydrofluoric acid was used as a conditioner, holding to an endpoint as the controlling factor, and quartz was depressed. The separation takes place with a pH of 3.

Using two bank sands, the recovery was 15 percent of the original weight with 50 percent quartz, of a product 98.6 to 99 percent SiO_2 , and the tailings were found suitable for plaster sand, or other uses which helps the economics. A minus 10-mesh material was processed which, Mr. Cummings stated, could have been finer if air cells were used. Cost for all reagents averaged \$2 per ton of finished product. Work is now under way at Ottawa to determine the applications of the end product.

Mr. Cummings believes the product will have principal application in steel foundries, particularly if it can be produced with by-products of value, or as a by-product. In British Columbia, consumption of foundry sand is 6000 tons annually and there is no glass sand market in that area. An advantage that he claims for such a "manufactured" foundry sand is that the alumina and other variables may be controlled to raise or lower the refractoriness.

With a limited market and a low recovery of these sands, he emphasized that it would be necessary for a commercial producer to produce it in order for the operation to be profitable. He said that the silica could be produced at \$5 or \$6 a ton to compete with \$7 Belgian silica, which was the price of silica imported before the war. A total of 450,000 tons of silica was shipped into Can-

(Continued on page 90)

Announcing Improvements ON THE MISSISSIPPI WAGON



One of the New MISSISSIPPI WAGONS

You Now Get More Speed (Up to 25½ M.P.H.), Synchronized 4-Wheel Tractor-Trailer Brakes, Other Features

Improvements made to increase the general versatility and efficiency of the MISSISSIPPI WAGON, now more than ever make it "the World's Most Modern Hauling Unit."

Gear changes in the M-R-S Special International Diesel tractor now make it possible for MISSISSIPPI WAGONS to travel at speeds up to 25½ miles per hour, saving valuable time and increasing profits on long hauls.

Four-wheel trailer brakes are available and are synchronized with the hydraulic brakes on the tractor, providing unusually smooth, effective braking for fast stops and steep grades.

If your problem is hauling over the highways on long hauls, the MISSISSIPPI WAGON will

now provide you with still greater economy than heretofore.

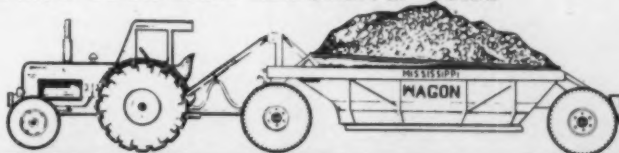
If your problem is construction work, the MISSISSIPPI WAGON will give you unusually low hauling costs per yard, placing you in the position of meeting and "beating" that tough postwar competition.

We can make deliveries for essential civilian uses, because our 1945 production is more than twice our 1944 production.

Write us or consult your nearest International Power Distributor for full information on MISSISSIPPI WAGONS—a thorough investigation will warrant your investment in MISSISSIPPI WAGONS—

"THE WORLD'S MOST MODERN HAULING UNIT"

MRS



MANUFACTURING CO.

JACKSON, MISSISSIPPI



This **MORRIS** HYDRAULIC CUTTER DREDGE

has proved its worth on
3 different deposits*
in 3 different locations...



Assembled, dismantled and moved overland 3 different times—for dredging jobs on 3 difficult deposits—the *Captain George*, a Morris 12" portable hydraulic cutter dredge has proved both its versatility and its mobility . . . demonstrating again that Morris dredges are engineered with two ends in view:—

1. **MAXIMUM OUTPUT** through getting the maximum amount of solids into the pump at a uniform rate.
2. **MAXIMUM LIFE** with a reasonable and economical wear of all parts.

Both require an efficient and correctly designed cutter operating at a proper speed, a properly laid out suction pipe arrangement, and an efficient dredge hoist that is simple in operation and capable of operating the cutter ladder and swinging the dredge quickly and accurately. The *Captain George* is an outstanding example of just such an efficient and well-balanced machine.

Write for Special Bulletin 144 giving specifications, cost-estimate data and recommendations on hydraulic dredging plants.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.

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MORRIS

CENTRIFUGAL PUMPS

* 1. (near Chicago) production of heavy sand and gravel, delivering through approximately 1500' of 12" discharge line against a 30' static discharge head. Used until deposit was exhausted.

2. (Mississippi River) dredging for locks and dams. Used until work was completed.

3. (Albert Lea, Minn.) A lake improvement project, moving 500,000 cu. yds. of mud, clay, sand and gravel through 12" discharge lines up to 3500' in length. Used for 7 months.

4. (Portland, Ore.) Now being set up for its fourth job.

Canadian Mining

(Continued from page 88)

ada in 1944. Magnetic separation after flotation has reduced Fe_2O_3 to .06 percent which approximates some of the glass sand requirements.

Engine Sands

G. M. Hurr, Development Department, Canadian Pacific Railroad, Montreal, told of work now under way to develop specifications for engine sands in western Canada. The only factors considered of importance are clay content and grain size. Thus far, acceptance has been based upon master mechanics who determine by eye and the feel of the sand if it will be satisfactory. Standards are being developed to enable discovery of new sources in the West where the Canadian Pacific railroad uses 12,000 tons annually alone, and at the prevailing price of 60c per ton.

In correlating testing, with sands known to be acceptable it has been found that 1 percent clay is the maximum permissible and $\frac{1}{2}$ percent or less is better. All sand passes a $\frac{1}{4}$ -in. screen and fineness numbers of 16 or less, down to 25, are most acceptable. Low clay content is desired to prevent clogging of the air jet openings in locomotive boxes.

Asbestos

CHARLES D. BORRER, chief engineer, Canadian Johns-Manville Co., Ltd., described "Core Drilling for Asbestos" at the Jeffries mine at Asbestos, largest asbestos mine in the world, and the session concluded with colored motion pictures by the staff of the company depicting the entire mining and milling operations.

Mr. Borrer covered the use of core drills in detail and the means for logging the occurrence of asbestos as a guide to mining operations. The occurrence is highly variable and diamond drills are employed in core drilling. Average footage for a bit with new stones is about 160 ft. after which the bits are reset. The diamond cost averages 19½c per ft. of hole.

The mine itself is 3000 ft. across (an open pit) and is covered with 25 to 125 ft. of overburden which is removed to spoil dumps by locomotives and side-dump cars loaded by a 4-cu. yd. shovel. The mine is quarried on 40-ft. benches. The motion pictures showed the mine operation in detail through the milling operation to the finished products.

Canadian Statistics

A preliminary report on the mineral production of Canada for 1944, prepared by the Dominion Bureau of Statistics was presented by W. H. LOSEE, Ottawa, before the opening general session.

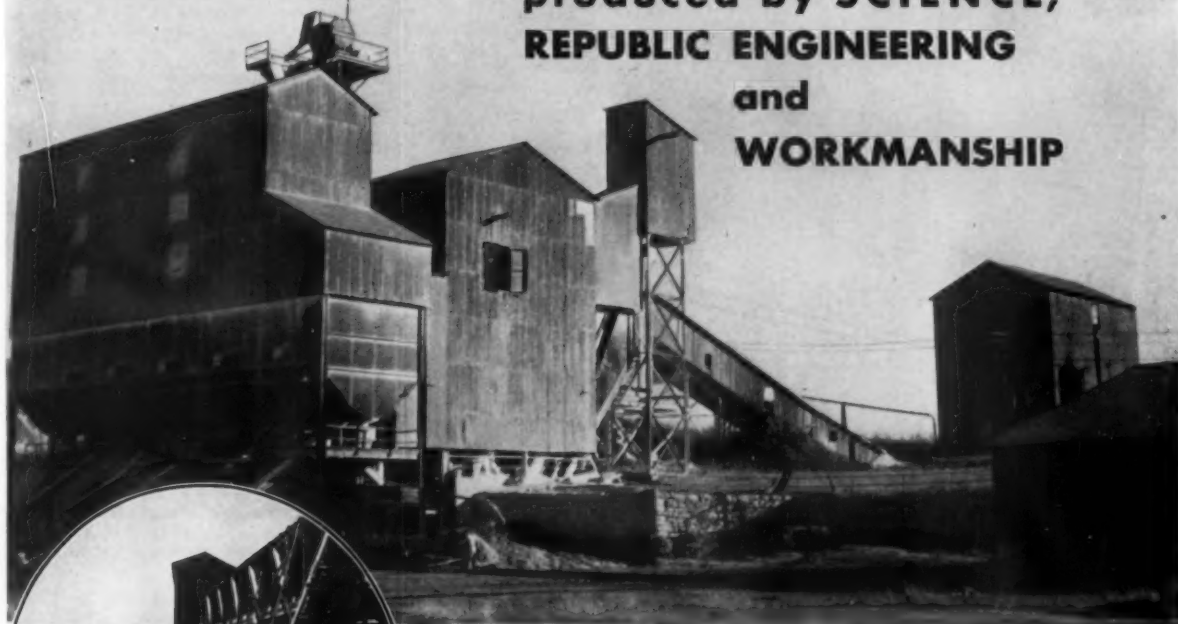
Industrial mineral production was

(Continued on page 92)

Longer Belt Service

produced by **SCIENCE,**
REPUBLIC ENGINEERING

and
WORKMANSHIP



TODAY'S and tomorrow's construction projects will require vast tonnages of stone, cement and aggregates. Equipment must be in condition to meet this demand. Republic engineers know that quality is determined by the ability of a conveyor belt to handle the required load without failure, and to give long, economical service. Combining the fruit of scientific research, man-made rubber, with "for-the-job" design, and honest workmanship, Republic produces Conveyor Belting to these standards. Super Excelo Reprene and Record Maker-S are recognized as top quality products in their respective service classifications. Consult your Republic Distributor on the correct belt for each conveyor installation.

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LEE DELUXE TIRES AND TUBES
CONSHOHOCKEN, PA.

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PARTICIPANTS IN THE
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CORPORATION

5 Advantages to Dredging



with Eagle "Swintek" Ladders

1. Cutter chain screens nozzle—reduces clogging.
2. Maximum agitation close to nozzle increases ratio of solids taken in.
3. Cutters and nozzle operate efficiently at any ladder angle—maximum working depth assured.
4. Permits dredging in harder strata.
5. Carries oversize rocks away from suction zone.

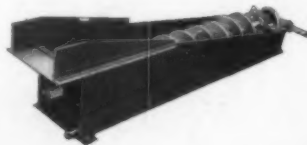
There's safety in numbers and the number of Eagle "Swintek" Ladders in use speaks for itself. Users report up to 400% increased production from their dredges and as little as six hours per year lost time due to clogging. They can readily be fitted to any dredge. Sizes and lengths for any operating condition. Let our engineers make recommen-

dations for the conversion of your dredge or let us work with your dredge-builder on your postwar re-equipment. Send for copy of "Dredging With Eagle 'Swinteks'."

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Des Moines, Ia.

*Eagle Screw Washers,
Log Washers, Dehydrators,
Classifiers*

30 to 180 tons per hour capacity. Soundly designed modern drives. Features that insure cleaner sand and maximum production. Send for Bulletin 44.



EAGLE Specialized Sand and Gravel Equipment
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LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS
EAGLE IRON WORKS
DES MOINES, IOWA
"SERVING INDUSTRY FOR OVER SEVENTY YEARS"

valued at \$37,628,575 in 1944 as compared with \$38,716,568 in 1943. Asbestos, with a production of 420,880 tons valued at \$21,599,787, represented more than half the total. Production of portland cement and aggregates is modest by U. S. standards but comparative figures for 1944 and the preceding war years are much more favorable than in the United States.

Production of cement in 1944 was 7,172,462 bbl. valued at \$11,517,035 as compared to 7,302,289 bbl. at \$11,599,033 in 1943. Lime declined only slightly from 907,768 tons valued at \$6,832,992 in 1943 to 893,120 tons valued at \$6,760,262. The decline in sand and gravel was from 25,744,469 tons valued at \$9,005,857 in 1943 to 24,921,950 tons valued at \$9,375,388 in 1944 and crushed stone declined from 7,222,950 tons valued at \$7,964,179 in 1943 to 6,360,775 tons valued at \$6,779,551 in 1944.

The war peak for cement was 9,126,041 bbl. valued at \$14,365,237 in 1942; for lime, 907,768 tons valued at \$6,832,992 in 1943; for sand and gravel, 31,604,806 tons valued at \$10,375,723 in 1941; and for crushed stone, 7,978,066 tons valued at \$8,746,594 in 1942.

Lime Kiln Designs

(Continued from page 74)

kiln as a very hot combustible gas. This is accomplished through the combination use of the Azbe center burner and the Azbe hot gas offtake. The center is the gas producer proper. The hot gas offtake is located at the end of the dissociation zone. Through this offtake, air is drawn from the outside and hot gases from the kiln, the two combining to a very hot mixture which is blown by a fan into the center burner. At the entrance of the center burner, oil is injected into the hot gas stream, mechanically finely atomized. The high temperature vaporizes the minute droplets immediately, the hot air present causing some of the oil to burn and further raising the temperature when the balance of the oil cracks to H₂ and CO gas. This gas then escapes at high velocity into the kiln through the lateral openings of the center burner.

Purchase Stone Concern

THE ZENITH DREDGE Co., Duluth, Minn., has purchased the Duluth Crushed Stone Co. D. C. MacDonald, president of the Zenith company, has announced that the stone crushing plant will be modernized to meet a large demand in the post-war building program.

Buys Sand Plant

PAUL S. KLYNE, for a number of years with the West Jefferson Sand & Gravel Co., London, Ohio has purchased a plant at Hillsboro, Ohio.



FOR MAXIMUM ECONOMY

**in Quarrying, Metal
Mining, Construction**

Users of Hercomite* and Gelamite* report maximum breakage for every dollar's worth of explosives. Savings of 10% to 15% have been common, compared to the older types of explosives.

Hercomite and Gelamite are now more popular than ever before—the best proof of their efficiency. Yet they are but one example of many outstanding Hercules' developments in the field of explosives.

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Always fast-priming ... and non-leaking

Even after hundreds of hours of toughest service, water is kept in and air out as effectively as when new because the seal rings are made of Tungsten Carbide, a material so hard it cuts glass like a diamond. There's no loss of vacuum, so high priming efficiency is constantly maintained. The performance of every Carver pump is carefully checked in our testing laboratories to make sure that it meets our high standards for performance on the job. The "Certified" tag is your assurance of peak performance on your toughest jobs. Carver pumps are available in a wide range of sizes from 1½" to 10" For details see your Carver dealer.

THE CARVER PUMP CO.
Muscatine, Iowa



CARVER CENTRIFUGAL
Certified **PUMPS**

Waste Heat Boiler

(Continued from page 79)

opposite the kiln are omitted to permit access to the nose ring of the kiln, to allow for sudden expansion of the gases in leaving the kiln, and to prevent injury to such tubes when back-rings in the kiln are being shot. A steel armor plate may be lowered into the gas passage in front of the tubes directly opposite the kiln opening for the purpose of protecting the tubes when the back-rings in the kiln are being shot. Removable insulating blocks are provided to cover the upper headers and also economizer headers, and to facilitate operation of the soot blowing apparatus.

Boiler tubes are separated into front and rear banks connected to the upper and lower headers and water boxes. The steam drum of the boiler, located between and above the two banks of boiler tubes, is supported by and connected between the upper water boxes similar to conventional types of boilers equipped with box headers. As shown in Fig. 1, the upper water boxes, adjacent to the drum, are gradually enlarged to provide free entry of steam from the water boxes into the drum.

In the space between the front and rear banks of boiler tubes and directly below the boiler drum there is a superheater, consisting of tubes, the ends of which are expanded into the inlet header, outlet header and connecting boxes. The smaller superheater tubes have internal cores, and are provided with external cast metal, special shaped sleeves shrunk on to fit on the tubes. Economizer tubes are similarly equipped with sleeves.

Water and Steam Circulation

Water and steam circulation are shown in Figs. 1, 2, and isometric view, Fig. 3. The water supply enters the first compartment of the economizer lower water boxes, (A) Fig. 3, the baffles (B) deflecting the water through the lower connecting nipples into the lower header (C). It then flows up through the row of heating tubes (D) into the upper header (E) and into the first compartment of the upper water boxes (F). Baffles deflect the water through the downcomer tubes (G) and into the first and second compartments, respectively, of the lower connecting boxes. The water descending through the downcomer tubes reenters the lower header and recirculates upward through the heating tubes. The portion of the water descending through the downcomer tubes into the second compartment of the lower water boxes passes, successively, into two headers, then upward through heating tubes into the corresponding upper two headers. The water circulation thus continues successively through the remaining sections of

(Continued on page 96)

*Here is a
noteworthy
fact*



GATES *Synthetic Rubber* V-Belts

—are **TODAY** delivering **BETTER SERVICE**
than **Pre-War Belts of NATURAL RUBBER!**

*—and here's
the reason
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Every day, on battlefields all over the world, U. S. Army tanks, tractors and self-propelled big guns are giving Gates V-belts a severity of service that no belts built before the war could possibly stand. Gates developed these combat-unit V-belts through specialized research and is building them entirely of synthetic rubber!

The importance of this fact to industrial V-belt users is this—

●Every improvement developed by Gates for these Army V-belts has also been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.

In many other products, as you know, war-time improvements must be withheld from general use until after the war is won. Gates V-belts are a notable exception to this rule for the simple reason that Victory depends upon production and production depends upon V-belts to drive the producing machines. That is why Gates has been able to give you immediately in your standard Gates Vulco Ropes, every V-belt improvement which Gates specialized research has developed for use on the Army's motorized equipment.

It is because of these facts that the Standard Gates Vulco Ropes you are now getting are giving you better service than any V-belts that were ever built before the war.

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WILL NOT PRODUCE HEADACHES from handling... reduces discomfort from breathing muck pile fumes. Better working conditions for you and your men!

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WILL NOT FREEZE or leak at Arctic or Tropic temperatures. Maintained high efficiency... anywhere ... anytime!

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WITHSTANDS IMPACT in high-powered Rifle Bullet Test. Greater safety for workers!

• These three Trojan advantages mean greater safety and comfort for your workers—increased efficiency during and after all blasting operations. Known throughout the Country as outstandingly reliable products, uniformly effective in all kinds of climate, Trojan Explosives can be relied upon to 'do a job'—and do it well!



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OFFICES: ALLENTOWN, PA. • SAN FRANCISCO, CAL. • LOS ANGELES, CAL. • PORTLAND, ORE. • NEW YORK, N. Y.

Waste Heat Boiler

(Continued from page 94)

the economizer until it leaves through the economizer outlet pipe.

The baffles in the upper water boxes, previously referred to, are provided with bypass openings which prevent vapor binding the upper economizer water boxes. The required amount of water to maintain the proper level in the boiler is fed through pipes (see Fig. 1) and the feed water regulator into the boiler drum.

With the boiler in normal operation, since the incoming water is of a lower temperature than that in the boiler, it will immediately flow down through the downcomer tubes into the lower water boxes which are embedded in the boiler wall as shown in Fig. 2, thence through the lower connecting nipples and headers into the steam generating tubes, upper headers and upper water boxes where the steam bubbles are drawn towards the drum and liberated into the steam space. The steam leaving the drum passes through a separator, thence to outlet pipe, superheater inlet header, tubes, stop and check valve to the steam main.

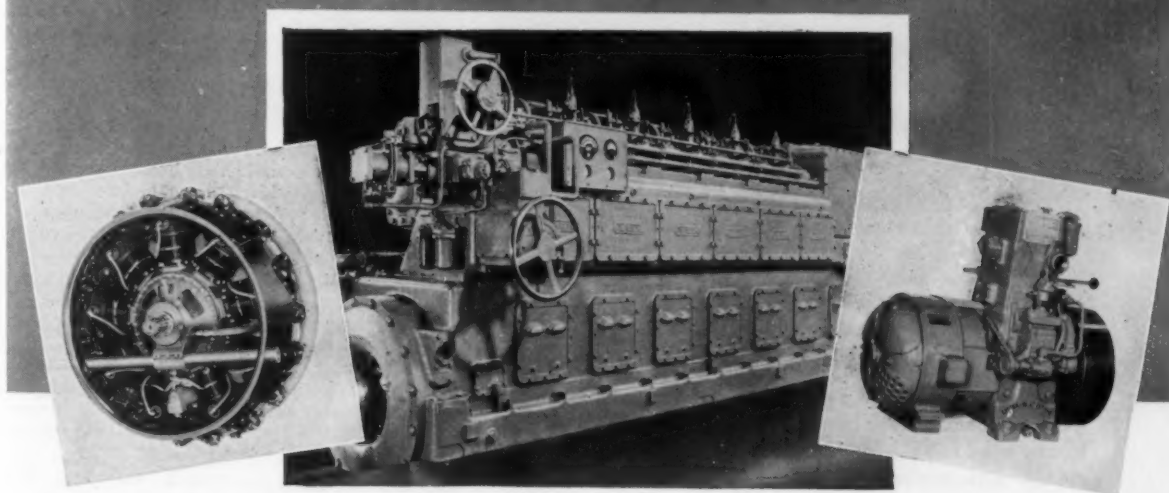
Dust Control and Removal

Unique apparatus is used for dust removal. The shaft of the raw kiln feed screw conveyor has attached to it a sprocket operating a gear wheel, shown in Fig. 1, that operates the variable speed transmission. Attached to the driven disk of the variable speed transmission is a cam which engages one end of the hinged lever. The other end of the lever is attached to one end of a bar by means of a pivotal joint. The other end of the bar is supported by the tension spring and stationary support. The floating bar carries rollers. Behind the floating bar is a stationary bar which, by means of a roller, diverts the longitudinal movements of the floating bar in such a manner that with each stroke of the hinged lever, the roller contacts the opposite sides of the stationary bar, causing the roller to travel in a unidirectional elliptical plane with each revolution of the cam. The insulated roller, also attached to the floating bar, forces the contact spring against the opposing contact spring, constituting a switch, which closes an electrical circuit. The current energizes a solenoid attached to a valve, which opens it. This action permits compressed air to flow through a series of pipes, Fig. 4, and the dust blower elements, dislodging the accumulated dust on the lower headers, blowing it into the dust conveyor openings, below.

There is also a portable soot blowing apparatus (see Fig. 1 and Fig. 6), which is used for the purpose of dislodging soot and dust adhering to the vertical tubes. This consists of a

PORUS-KROME

undercover... but unequaled



PORUS-KROME has nothing to hide . . . even though it is always undercover and out of sight. Its records for increasing the life of cylinders and liners are still unequaled, and the results are comparable in every type of heavy-duty engine . . . big marine Diesel, radial aircraft engine, or even small auxiliary power plants.

PORUS-KROME is hard, pure chromium which is applied to cylinder bores by the Van der Horst process. It has tiny pores and channels in its surface which serve as reservoirs for

lubricating oil, feeding it back as needed. It reduces corrosion and wear, and multiplies cylinder life 4 to 20 times . . . ring life 3 to 5 times.

Although the Army and Navy now absorb the entire production of its three plants, Van der Horst is eager to plan with engine manufacturers for postwar use of PORUS-KROME. Write today for full information about the advantages of greater reliability and lower maintenance cost that PORUS-KROME will give to your engines.

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Good for the Life of your Engines



U. S. PATENTS 2,048,578 AND 2,314,604

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ROCK PRODUCTS. May, 1945



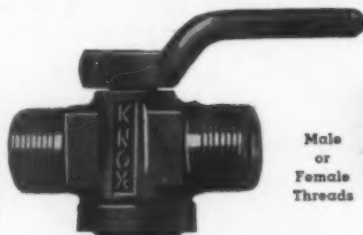
IT'S A CINCINNATI CONVEYOR BELT

Conveyor Belts carrying the name Cincinnati have been cited for achievement wherever used for moving aggregate in quantity. At home and serving with the military forces they have added a shining, new chapter to Cincinnati performance.

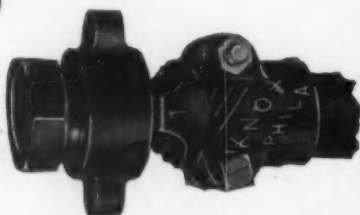
To those looking to the future, we say, keep your eye on Cincinnati for tonnage . . . for low belt cost per ton . . . for long service.

THE CINCINNATI RUBBER MFG. CO.
CINCINNATI, OHIO

CINCINNATI
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Male
or
Female
Threads



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Recognized Universally as the **ULTIMATE**
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KNOX MANUFACTURING CO.
818 CHERRY ST., PHILADELPHIA 7, PA.

rectangular frame fabricated from pipe and containing a number of nozzles which impinge jets of air on the tubes as the apparatus is lowered between the upper headers. Compressed air is supplied through a pipe to which is attached a flexible air hose. The pipe is suspended by means of an eyebolt to an electric or pneumatic hoist supported from an overhead trolley on a rail.

Double Cable Life

(Continued from page 71)

ond and third use after initial retirement.

Added life may be obtained by merely changing ends on a rope. If heavy wear shows, for instance, at the boat end of one of our barge cables, life of that cable can be increased by switching ends and placing the worn end on the drum where there is little strain.

Since we have gone all out for longer equipment life, we have been cutting back, splicing, resocketing, even using ropes on drums for machine work which have been used as guys. When steel clips are used instead of cast on preformed rope, there is no tendency to kink where the clip was removed.

We believe we are just beginning to learn better maintenance and repair methods. We are not going back to the old way. In 1943 we turned out 200,000 tons of sand, and we did it with 50 percent less equipment charge than was required to deliver 120,000 tons in 1939. The 1944 figures show improvement over 1943.

When the war is over and new equipment can be purchased without priorities, we expect to make some replacements and enlarge our plant.

Cement Safety Meeting

PORTLAND CEMENT ASSOCIATION has been holding a series of regional safety meetings. One of the recent meetings was held at Ironton, Ohio. Ernest Brownstead, superintendent of Alpha Portland Cement Co., served as chairman at one of the sessions, which was addressed by A. J. R. Curtis of the P.C.A. F. L. Maus, personnel director of Alpha, was luncheon chairman. Companies represented include: Alpha, Columbia, Southwestern, Wabash, Diamond and Superior.

Feldspar Plant Burns

GENERAL MINERALS, INC., New York, N. Y., suffered a loss estimated at \$50,000 when its Cold River Minerals feldspar plant burned down, according to a statement reported to President P. H. Spiers.

Lime Contract

MARBLE CLIFF QUARRIES CO., Columbus, Ohio, recently put in a bid of \$8.10 a ton for lime to supply the waterworks of Hamilton, Ohio.

"The Magic Powder"

GROWTH and development of the Universal Atlas Cement Co., is personalities and products, from the inception of its parent company in 1885 to the present day, is highlighted in "Magic Powder" by Earl J. Hadley, author and well-known feature writer in national magazines. The story is laid in a matrix of cement history, dating back to the Romans, who used natural cement or puzzuolana in structures such as the Pantheon. The art was lost, however, for many centuries until its revival in England in 1756. Sixty-eight years later, the author relates, Joseph Aspdin in England made the first artificial cement, and in 1889 José de Navarro, first president of Atlas Cement Co., inaugurated the use of the rotary cement kiln in this country.

Such catastrophies as the Baltimore and San Francisco fires gave impetus to fire-resistant construction, viz., concrete encased steel. The author points out that products like Atlas White, Lumnite, Air-Entrained Cement, Unaflo, etc., had to be developed to hold the patronage of a market progressively wider in scope.

Biographical sketches and anecdotes are numerous in "The Magic Powder," and include such names as José de Navarro, George Bartlett, Peter Beck and others responsible for development of cement markets.

In describing the evolution of the Portland Cement Association the author portrays development of a need for such an organization, functioning as it does to disseminate knowledge on concrete making and uses. To illustrate, and quote a statement attributed to George Beck, "There is no structural material which depends as much for its final value on the wide distribution of information concerning the influence of each step in the process of manufacture as does concrete." Likewise the setting up of the first A.S.T.M. American Standard Specifications in 1922 gave definition to cement and concrete.

The virility and alertness of what became Universal Atlas in 1930 is well illustrated by its successful weathering of two major depressions, U. S. Government suits, railroad car shortages, and one-time widespread public prejudice, and at the same time expanding the use of cement products to new fields. The latest is that of architectural concrete, cast on the job such as that done on the Pentagon Building in Washington, D. C., and precast architectural shapes used in making the Baha'i Temple at Wilmette, Ill.

"Magic Powder" is profusely illustrated with photographs of Universal Atlas plants and personalities and outstanding examples of concrete structures and contains 287 pages. It is published by G. P. Putnam's Sons, New York, N. Y., and may be obtained for \$3.50 a copy.

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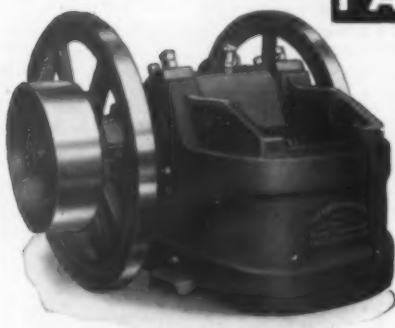
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OBITUARIES

WALLACE L. CALDWELL, president, Alabama Asphaltic Limestone Co., Birmingham, Ala., died April 2 at the age of 56. Mr. Caldwell formerly was president of the Kentucky Rock Asphalt Co., Louisville, Ky.

JOSEPH HOCK, retired president of the Consumers Co., Chicago, Ill., and formerly president of the Wisconsin Lime and Cement Co., died recently at his home in Oak Park, Ill. He was 72 years old.

RICHARD B. HYNES, purchasing agent and former secretary of the Universal Atlas Cement Co. and the Atlas Lumnite Cement Co., New York, N. Y., died March 21, at his home in Scarsdale, N. Y.

N. R. FRANCE, retired president of the France Stone Co., Toledo, Ohio, died recently at his winter home in Daytona Beach, Fla. He was 82 years old. Mr. France joined the company, which was founded by his father, Enoch France, nearly 60 years ago. After his father's death he became president of the company, which position he held until his retirement in 1931.

GEORGE T. HORTON, president of the Chicago Bridge & Iron Co., Chicago, Ill., died March 19. Mr. Horton, a retired lieutenant-commander, U.S. N.R.F., was a charter and honorary member of the Chicago Engineers Club, and a member of the American Society of Civil Engineers, the Western Society of Engineers, the American Society for Testing Materials, and the Society for Naval Architects and Marine Engineers.

AMEDEE H. SMITH, chairman of the board of directors of the Hyster Co., Peoria, Ill., died March 25 in Portland, Ore. He was 76 years old. Mr. Smith also was president of the Willamette Iron & Steel Co., and a director of the Portland General Electric Co.

FRED ZEUCH, owner of the Cleveland Gravel Co., Cleveland, Ohio, died recently. Mr. Zeuch also was secretary of the Henry G. Slatmeyer Co., and had been associated with the construction firm for 45 years.

JOHN EDWARD NOELP, president of the Newark Sand and Gravel Co., Newark, Ohio, died April 4. He was 57 years of age.

C. KIER DAVIS, president of Athey Truss Wheel Co., Chicago, Ill., died as a result of an automobile accident which occurred in Chicago, March 7.

NELSON E. MCLOON, for 30 years superintendent of the Glencoe Lime and Cement Co., St. Louis, Mo., passed away recently.

New Incorporations

Millstone Granite Quarry, Inc., Waterford, N. Y., has been incorporated with a capital stock of \$10,000, divided into 100 shares of no par value. Commence business with \$2,000. Incorporators are Dante J. Tedaldi, Andrew Faretli, both of Bronx, N. Y., and Norma Malich of New York, N. Y.

Denton Sand and Gravel Co., Clayton, Mo., has been organized by Joseph X. Streblor, St. Louis, Mo.

Aetna-Sigler Sand Co., 11 S. LaSalle St., Chicago, Ill., has been incorporated for the purpose of mining and selling all grades of sand. Capital 100 shares common, par value \$100. Incorporators are H. Ollie Sigler, A. Anderson and R. G. Raysa. Correspondent is McKinney, Folomne & Grear, 105 W. Adams St., Chicago, Ill.

Wabash Sand & Gravel Co., Terre Haute, Ind., has been incorporated for the purpose of furnishing material for graveling roads in Indiana and Illinois and selling to contractors. Authorized capital \$30,000. Incorporators are James H. Swanson, Charles C. McCormick, both of Terre Haute, and Frank T. O'Hair of Paris, Ill.

The LaSalle Silica Co., LaSalle, Ill., has been organized and received a charter to take over operation of the sand and gravel plant of the Aetna Sand Co., with a capital of \$50,000.

Manufacturers' News

Independent Pneumatic Tool Co. has promoted John Corkery to the position of advertising manager. Norm Kirchner, formerly a member of the organization, has joined Evans Associates, Inc., the agency for the company.

Dewey & Almy Chemical Co. has been awarded for the fourth time the Army-Navy Production Award for outstanding achievement in producing material essential to the war effort. The award means the addition of a third white star to the "E" pennant.

United States Rubber Co. has announced the appointment of Howard W. Kelsey as sales promotion manager of the general products division.

The Marion Steam Shovel Co. has elected Maynard E. Montrose president and general manager of the company.



Maynard E. Montrose

Mr. Montrose formerly was associated with the General Electric Co. In 1935 he joined the Lane-Wells Co. and served in important managerial positions. He was executive vice-president of the company until his recent resignation. J. M. Strelitz has been named chairman of the board and general counsel; Alec Gibson was made vice-president and treasurer; John P. Courtright, vice-president in charge of sales; Harvey T. Gracely, vice-president, and M. Virden, secretary and assistant treasurer.

General Electric Co. announces that J. E. N. Hume, commercial vice-president and manager of the industrial divisions, and J. W. Belanger, manager of the Federal and Marine divisions, have been named assistant managers of sales of the apparatus department. Karl H. Runkle has been named manager of the industrial divisions to succeed Mr. Hume, and R. S. Neblett has been named Federal and Marine divisions manager to succeed Mr. Belanger. W. V. O'Brien has

DOUBLE REDUCTION on the Double Impeller

New Holland Model 3030

By Combining Primary & Secondary Reduction in One Unit Crushes Run-of-Quarry Stone as Large as 30 Inches to an Optional Minimum of 80% Under 1 Inch.



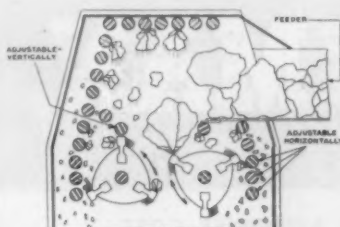
Model 3030 operating in limestone quarry owned by D. M. Stoltzfus & Son Co., Quarryville, Pa.

THE New Holland Model 3030 is a new-type crusher that merits being called an innovation. The impacting action of its two gigantic impellers, operating clockwise and counter clockwise, represents a practical combination of primary and

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Yet as little as 100 horsepower handles 100 to 150 tons per hour. The Double Impeller is suitable for portable or stationary purposes.

Write today for complete details on this new machine which operates on a new basic principle. Address Department RP-5.



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A Sauerman machine digs with equal facility under water, on mushy ground, on a hillside or in a rough pit. Operation is continuous—digging, hauling and dumping. Capacities run from 10 to 600 cu. yd. per hour, varying in accordance with size of bucket and length of haul.

Operation and maintenance of a Sauerman machine is simple. Small overhead and moderate power requirements mean larger profits on every yard of material produced.

Write for our catalog and at same time tell us about your problems.

SAUERMAN BROS., Inc., 530 S. Clinton St., CHICAGO 7

been made manager of the Central Station divisions, succeeding H. V. Erben, who recently was named assistant general manager of the apparatus department.

Gardner-Denver Co. has announced that Alfred Kauffman, retired president of Link-Belt Company, has been elected a director of the company. He succeeds P. H. Gardner, who has resigned because of ill health. Mr. Kauffman remains a member of Link Belt Company's board of directors. He is also a member of the board of the LaPlant-Choate Manufacturing Co., and of the Cardox Co.

Wickwire Spencer Steel Co., New York, N. Y., has announced the appointment of A. S. Ralston as sales manager of the wire rope division. Mr. Ralston was previously with Carnegie-Illinois Steel Co., American Steel & Wire Co., and American Chain & Cable Co. He was also associated with Wickwire Spencer for 10 years as sales engineer and wire rope sales manager.

Barber-Greene Co. has announced the appointment of John H. Dykstra as advertising manager. Mr. Dykstra, formerly with Mumm-Mullay & Nichols, Inc., advertising agency, succeeds Blain S. Britton, who has resigned to go into business for himself doing photographic and publicity work in the construction and allied fields.

Atlas Powder Co. has named James H. Buchanan as manager of the new Chicago district sales office, including the States of Illinois, Wisconsin, Minnesota and most of Indiana. Mr. Buchanan has represented Atlas in Chicago since 1938, where he came after eight years as the company's representative in Mexico. Previously he had engaged in the banking, oil refining, mining and lumber industries in Mexico, and had engaged in the importing and exporting business at El Paso, Texas.



James H. Buchanan

United States Rubber Co. has appointed Luther B. Martin as director of tire development and research, with headquarters at Detroit, Mich.

Caterpillar Tractor Co. announces that Fred G. Nunneley, Canadian sales manager of the company since 1935, has resigned his position to become general manager of the Powell Equipment Co., Ltd., Winnipeg, Canada.

H. K. Porter Co., Inc., announces the election of S. B. Heppenstall, Jr., as vice-president, with headquarters in Pittsburgh, Penn. Mr. Heppenstall was formerly vice-president in charge of sales.

Mack Trucks, Inc., has appointed C. F. Larsen as service manager of the general service department. S. H. Bridges has been named manager of the Poughkeepsie, N. Y., branch, replacing H. L. Weatherwas, who resigned. G. L. Murphy is the new manager of the Utica branch. R. J. Meinert has returned to the company as manager of national account sales in the Central division, with headquarters in Chicago, following a two years' leave of absence.

Worthington Pump & Machinery Corp. announces the appointment of Carl F. Oechle, manager of the construction equipment department, as vice-president in charge of sales of Ransome Machinery Co., Dunellen, N. J., a subsidiary, with headquarters in Holyoke, Mass., and regional offices in New York, Washington, Cleveland, Chicago and San Francisco.

Bristol Co. announces the appointment of C. E. Mason as technical director, with headquarters in Waterbury, Conn.

Hyster Co. has appointed James A. Roach factory representative to cover the Atlantic seaboard states, with headquarters at 90 West St., New York, N. Y. Mr. Roach formerly was with Mercury Mfg. Co., Chicago, Ill.

Bailey Meter Co., Cleveland, Ohio, announces the appointment of P. S. Dickey as chief engineer. Mr. Dickey will supervise all engineering, research and design activities for the company. He will be assisted by H. H. Gorrie, assistant chief engineer, and R. E. Clark, manager of contract engineering.

Towmotor Corp. announces the appointment of Ray E. Madden as district sales and service representative for the Chicago area.

Caterpillar Tractor Co. has advanced M. T. Deames to the position of assistant general parts manager. Assisting Mr. Deames will be A. H. Yingst, for export and governmental sales; T. H. Hodgins for the Central sales divisions; C. M. McKnight for the Western and B. W. Kramm for the Eastern sales divisions. E. L. Mason, H. F. Haven and C. D. Byrns have been appointed assistant parts managers of the Central, Western and Eastern sales divisions, respectively.

A. Leschen & Sons Rope Co. has announced the appointment of Douglas W. Vernon as general manager of sales.

LaPlant-Choate Mfg. Co., Inc., has named B. L. Myers as vice-president and general sales manager, succeeding H. H. Buchanan who has resigned. Mr. Myers was vice-president in charge of export sales.

Evercrete Corp., manufacturers of protective and decorative coatings for masonry surfaces, announces free technical service to the public regarding masonry problems at their headquarters in The Evercrete Building, 424 W. 42nd St., New York 18, N. Y.

Allis-Chalmers Mfg. Co. has announced the re-appointment of F. S. Cockburn as field representative in Peru. He will work in conjunction with The Peruvian Trading Corp., Ltd., S. A., the company's distributors for Peru, and will be located at Casilla 2233, Lima, Peru, S. A.

Gardner-Denver Co. has received direct word from Francis R. MacNamara, Manila representative, who was among those liberated February 23, from Los Banos Internment Camp, south of Manila, that he is in fair health except that he has thinned down to about 120 pounds (at the time of his internment he weighed 205 pounds). Mr. MacNamara went to the Islands in April of 1940, but his family returned to the States during the summer of 1941. Although suffering from a little beri-beri, in the ankles, and rubbery legs, he says that this will clear up in a couple of days with the meat they are now getting.

Frank C. Bennett, sales manager, Atlantic Gulf & Pacific Co., Gardner-Denver distributor in the Islands, was also liberated with Mr. MacNamara. He advises that Mr. Pitzsimmons, president of the company, died last year from a heart attack, and Cliff Larsen was shot by savages in January due to mistaken identity. Also that Mr. Garnezy, vice-president, will become active head of the company and that he will occupy his old position of sales manager.

Robins Conveyors, Inc., has elected Thomas Robins, Jr., president of the company to succeed Thomas Matchett, president since 1928, who has retired from active part in the management. Mr. Robins has been chairman of the executive committee for the past five years. He also is president of Hewitt Rubber Corp., vice-chairman of the board of directors of the National Synthetic Rubber Corp., director of the Federal Reserve Bank of New York, Buffalo branch; the Marine Trust Co. of Buffalo and Niagara Share Corp. Currently he is vice-president of the Buffalo Chamber of Commerce. Samuel C. Park, Jr., has been appointed a member of the board of directors to represent the interests of Col. John Hay Whitney, now overseas with the U. S. Army Air Forces. All directors of the company were re-elected, namely, Thomas Robins, Thomas Robins, Jr., S. D. Robins, Thomas Matchett, T. W. Matchett, H. Von Thaden, James B. Taylor, Herman Goldman, Pierre Jay, Knight Woolley and F. G. Cooban.



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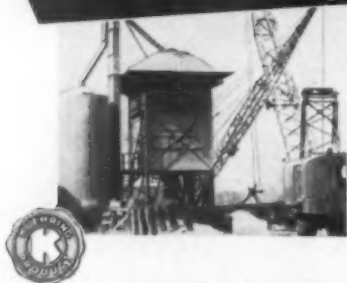
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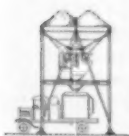
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Minimize your investment. Add units as needs grow. Boready for quick expansion, if postwar opportunities warrant—30, 60 or 120 yards—as you need it.



At left—basic 30-yard bin with 2 or 4 compartments. Below (at left)—Next step—60-yard with 4 compartments. Very flexible—The 4 compartments may be used for 2, 3 or 4 aggregates without any change of partitions. Central cement compartment may be added at any time.



120-yard plant is shown at right, the one you will need when your contractors call for concrete in a hurry. With this "Step-by-Step" plan, you make a safe, profitable investment.



Of course the JOHNSON patented "CONCENTRIC AGGREGATE CEMENT BATCHER" is an integral part of any good batching plant. This batcher will use either bag or bulk cement with real efficiency. FLEXIBILITY? YFS!

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Financial

RECENT DIVIDENDS

Alpha Portland Cement Co., \$.25	June 9
Canada Cement Co., Ltd.,		
6 1/2 % pfd.	1.25	June 20
Lehigh Portland Cement		
Co., pfd.	.25	Aug. 1
Pacific Portland Cement		
Co., pfd.	1.00	Mar. 27
Riverside Cement Co., pfd.	1.25	May 1
Schumacher Wall Board		
Corp.	.20	May 15
Schumacher Wall Board		
Corp., pfd.	.50	May 15

ARUNDEL CORPORATION, Baltimore, Md., had a net income of \$653,297 for the year ended December 31, 1944, which compares with \$776,543 for a like period ended December 31, 1943.

CLEVELAND BUILDERS SUPPLY CO., Cleveland, Ohio, reported a deficit of \$250,228 for the year ended September 31, 1944. This was due largely, however, to a loss taken on assets sold of \$440,108. In 1943 there was a profit of \$159,138. The company has a strong cash position with \$439,578 in cash, \$451,988 in government securities, and net receivables of \$585,398 as of September 31, 1944.

GIANT PORTLAND CEMENT CO., Philadelphia, Penn., had a net deficit of \$59,065 for the year ended December 31, 1944, which compares with \$17,348 for the year ended December 31, 1943. Net sales in 1944 were \$735,480 as against \$1,130,198 in 1943.

NATIONAL GYPSUM CO., Buffalo, N. Y., reports net sales of \$23,982,632 for the year ended December 31, 1944, which compares with \$21,739,687 for 1943. Net profit in 1944 was \$867,861 as against \$973,014 in 1943. A 15-year \$10,000,000 serial loan is being negotiated with insurance companies and banks to be used to refund outstanding \$5,731,000 S. F. 3 percent debentures, due 1955, and for post-war expenditures. Included in this latter program will be a \$2,500,000 board plant at Baltimore, Md., and a new lime plant at Kerns, Va., on the site of the Kimbalton Lime Co. plant, recently purchased.

MONOLITH PORTLAND MIDWEST CO., Los Angeles, Calif., reported a net profit after all charges of \$63,905 for the year ended December 31, 1944, which compares with \$71,556 for a like period ended December 31, 1943. Coy Burnett, president, has stated that "prospects for 1945 are for substantially the same volume with higher costs, higher sales prices and higher taxes."

PENNSYLVANIA GLASS SAND CORPORATION, Lewistown, Penn., had a net profit of \$570,706 for the year ended December 31, 1944, after all charges and taxes, as against \$613,320 for

the year ended December 31, 1943. Net sales in 1944 were \$5,479,895 as compared with \$5,407,756 in 1943. The company has anticipated all sinking fund payments up to April, 1949, with a \$300,000 payment on the first mortgage 3 1/2 percent sinking fund bonds during 1944, according to President William J. Woods.

DIAMOND PORTLAND CEMENT CO., Middle Branch, Ohio, reported a net deficit of \$15,826 for the year ended December 31, 1944, which compares with a profit of \$17,900 for 1943.

PACIFIC PORTLAND CEMENT CO., San Francisco, Calif., reported a net income of \$191,074 for the year ended December 31, 1944, after charges and taxes, as against \$412,905 for the year ended December 31, 1943. Sales in 1944 were \$4,456,390 as compared with \$5,681,839 in 1943. President J. A. McCarthy has advised that improvements and additions to property in 1944 amounted to \$269,864 as against \$200,969 in 1943. Reserve funds are being accumulated to permit substantial outlays expected to be required for repairs, additions and improvements deferred due to war time shortages and restrictions.

AIR ENTRAINMENT Demands Accurate W/C Ratio Control

**[SC]² PRECISION
CONCRETE
CONTROL**

provides it. It includes:

Moisture Meter

Makes a test for moisture content of sand or stone in ONE minute. Accurate to 1/4 per cent.



Compensator
Delivers correct DRY weight of aggregates and ADDED water. Makes a graph record of EVERY BATCH.

[SC]² CONTROL produces uniform concrete. Is always approved by concrete engineers. Has definite sales value. Write for our booklet "Profits in Concrete."

SCIENTIFIC CONCRETE SERVICE CORP.
McLachlen Bldg., Washington, D. C.

LEHIGH PORTLAND CEMENT Co., Allentown, Penn., presented the following consolidated income account for the years ended December 31:

	1944	1943
Net sales	\$13,378,374	\$17,306,953
Cost of sales	9,007,712	10,443,083
Deprec. & depletion	1,639,453	1,768,441
Selling, etc., expense	2,364,616	2,650,897
Operating profit ..	366,593	2,444,532
Other income	221,018	247,091
Total income	587,611	2,692,223
Fed. income tax ..	187,000	1,018,500
*Exc. prof. tax, net ..	900	6,000
*Inc. tax adj. net..	cr700,000	.....
Net income	1,009,711	1,667,723
Preferred divs.	226,964	226,964
Common divs.	726,192	1,089,307
Surplus for year ..	146,555	351,452
Earn. surplus, 1-1 ..	3,943,823	3,592,371
Earn. surplus, 12-31 ..	4,090,378	3,943,823
Times pfd. divs. ..	4.85	7.35
Earn. pfd. share ..	\$19.38	\$29.39
No. of pfd. shares ..	56,741	56,741

*Claim for refund of prior year's Federal taxes resulting from carry-back of unused excess profits credit, less applicable reduction of post-war refund of \$150,000.

*Subsidiary company.

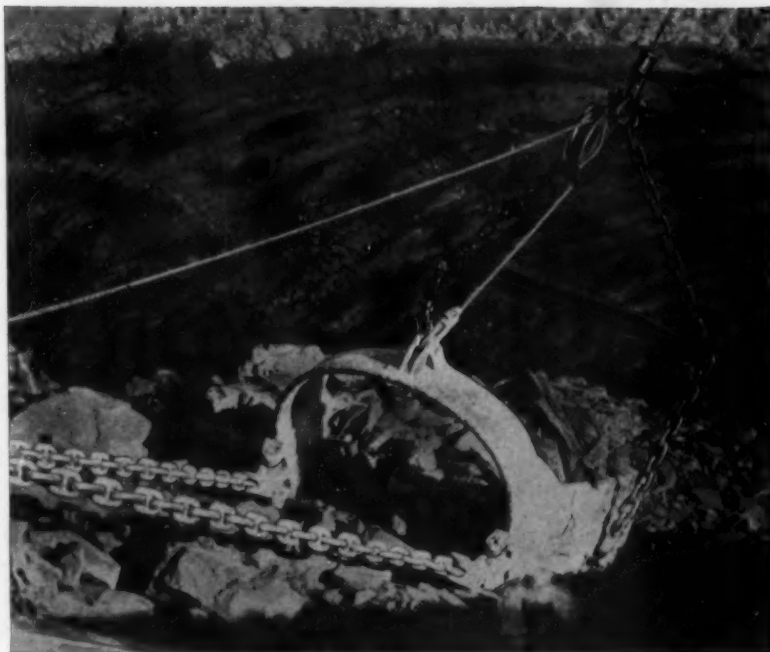
Although two plants were shut down for the entire year and seven of the remaining 12 plants operated at less than 50 per cent of capacity, Lehigh Portland Cement Co. showed a net profit in 1944. Return on invested capital, however, was reduced to 1.1 percent from 4.6 percent in 1943.

IDEAL CEMENT Co., Denver, Colo., had a net income of \$1,526,955 for the year ended December 31, 1944, after all charges and taxes, which compares with \$2,010,888 for 1943. Sales reported in 1944 were \$6,854,472.

DOLESE & SHEPARD Co., Chicago, Ill., reported a net profit of \$36,081, after taxes and charges, for the year ended December 31, 1944, which compares with \$50,182 for the year ended December 31, 1943. Total sales volume for 1944 was reduced about 18 percent from the previous year due to restrictions on construction, however, agricultural limestone sales increased 60 percent over 1943. President W. J. Lynch said that the company planned to concentrate on agricultural limestone for which there has been an ever-increasing demand.

FLORIDA PORTLAND CEMENT Co., Chicago, Ill., with plant at Tampa, Fla., had a net income of \$210,250 for the year ended December 31, 1944, after charges and taxes, as against \$292,678 in 1943. Net sales in 1944 were \$2,967,956 as compared with \$3,362,429 in 1943.

SOUTH DAKOTA STATE CEMENT PLANT reported a profit of \$76,000 for 1944, according to Norbert De Kerchove, business manager. Cement production fell to 273,629 bbl. in 1944 from 494,755 in 1943 when the plant supplied all cement for the Rapid City Army Air Base and other military projects.



Coal Strippers Know... You've Got to

TAKE IT OFF!

Results Show Page *Automatics* Are Tops for Uncovering Coal...

On more than 90% of the nation's coal stripping operations, Page AUTOMATIC dragline buckets dig through soapstone, shale and blasted rock in record time... and yet clean off the coal without tearing it up.

Page AUTOMATIC-DIGGING-ACTION increases yardage and reduces maintenance costs!

PAGE

Automatic

DRAGLINE BUCKETS

PAGE ENGINEERING COMPANY, CHICAGO 38, ILL.

PULVERIZERS for the reduction of Cement Materials, Limestone, Agricultural Limestone, Fire Clay and All Dry, Refractory Materials.

Capacities: 1 to 60 tons per hour

Finenesses: 20 to 350 mesh

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To Increase Capacities or Fineness of Present Grinding Plant—
To Reduce Power and Maintenance Costs—
To Insure an Absolutely Uniform Product—

Use the BRADLEY AIR SEPARATOR



Made of
Acid Open Hearth
Steel Wire

Round Strand
Flattened Strand
Preformed
Steel Clad
Non-Rotating

The Service Record of this
wire rope continues to make
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New York — Chicago — Denver
San Francisco — Portland — Seattle

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Any Metal
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Perforations are properly
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Send for catalog showing
wide variety of perfora-
tions, metals, etc.

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MISSOURI PORTLAND CEMENT Co., St. Louis, Mo., had the following income account for the years ended December 31:

	1944	1943
Net sales	\$3,566,816	\$4,339,163
Cost of sales	2,558,891	3,048,322
Selling, etc., exp.	452,060	504,248
Deprec. & deplet.	431,761	438,978
Operating profit	124,105	347,615
Other income	25,368	36,911
Total income	149,473	384,526
Other deductions	6,721	18,120
*Income taxes	118,000	153,134
Net income	124,752	213,273
Dividends	211,805	211,805
Surplus for year	d87,053	1,468
Earn. surplus, 1-1	1,165,261	1,163,793
Earn. surpl., 12-31	1,078,208	1,165,261
Earned per share	\$0.44	\$0.76
No. of shares	282,406	282,406

* No provision deemed necessary for excess profits tax.

† Less approximately \$28,000 tax reduction resulting from loss on sale of non-operating property which loss was charged against reserve provided therefor in prior years.

OHIO RIVER SAND Co., Louisville, Ky., showed a net profit of \$6896.59 in 1944, after charging off \$75,401.69 for depreciation. Net sales of sand and gravel were \$262,878 and revenue from barge and towing service was \$94,210, a combined total of \$357,088. Selling and administrative expense was \$275,678.

Sand-Lime Brick

FOUR active sand-lime block and brick plants reported for March and four for January, statistics for which were published in March, 1945. Statistics for February were omitted from the April issue as complete reports were not received in time.

AVERAGE PRICE FOR MARCH

	Plant Price	Delivered Price
Detroit, Mich. ....	.....	.....
Saginaw, Mich.	\$15.00	.....
Grand Rapids, Mich. ....	.....	\$16.20
Seattle, Wash.	19.50	22.50

STATISTICS FOR JANUARY AND MARCH

	*January	**March
Production	976,200	902,900
Shipments (rail)	355,000	185,000
Shipments (truck) ...	541,995	596,288
Stocks on hand	241,000	545,000
Unfilled orders	390,000	600,000

*Four plants reporting; incomplete, one not reporting stocks on hand and one not reporting unfilled orders.

**Four plants reporting; incomplete, one not reporting stocks on hand and one not reporting unfilled orders.

Chemical Engineer

H. MCC. LARMOUR, formerly chief chemist, Yosemite Portland Cement Corp., Merced, Calif., is now chemical engineer, Pacific Portland Cement Co., Redwood City, Calif. The Yosemite company has ceased operations and the plant is to be dismantled and shipped to South America.

Installs Air Separators

ALPHA PORTLAND CEMENT Co., Birmingham, Ala., is installing two Sturtevant air separators to place its 8- x 7- x 40-ft. Allis-Chalmers comp-mill in closed circuit when grinding high-early strength cement.

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ROCK PRODUCTS
CONCRETE PRODUCTS
and Cement Products

MAY
1945

• Houston Concrete Products Co. has most stockpile layout



Concrete Masonry Units for BEAUTIFUL WALL FINISHES



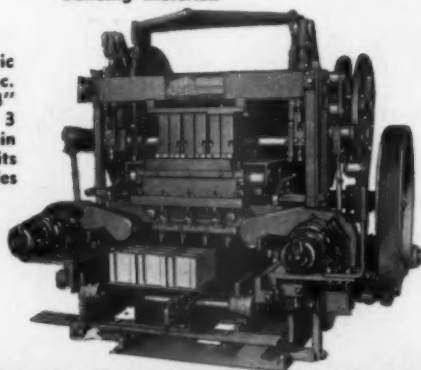
EITHER NATURAL OR PAINTED
... EXTERIOR OR INTERIOR



Besser Vibrapac Better Concrete Masonry units in the hands of skilled architects and builders have become in effect a new building material.

Besser Vibrapac Better Concrete Masonry is the fastest progressing building material today . . . available now and will continue to be available in any quantity when large scale building is resumed . . . Concrete masonry is safe, permanent, healthful, beautiful and economical in the highest degree of any all-purpose outside or partition wall and floor building material . . . here's a market ready for the product of your Besser Vibrapac.

Besser Super Automatic Plain Pallet Vibrapac. Capacity 600—8" x 8" x 16" per hour made 3 at a time on one Plain Pallet. Smaller units made in larger multiples on the same pallets.



**BESSER
VIBRAPAC**



Important Patent Notice

Licensed under the Collman basic vibration patents.

Undirectional vibration licensed under Flann patents.

The Vibrapac combines vibration with exclusive patented Besser Plain Pallet principle.

BESSER MANUFACTURING CO.

205 Forty-Fifth St.

Alpena, Mich.

Complete Equipment for Concrete Products Plants

THE SAVING IN PALLET COST WILL PAY FOR A BESSER VIBRAPAC PLAIN PALLET STRIPPER

FIVE YEARS From Backyard to Modern Plant

Houston Concrete Products Co., starting with a small hand tamper block machine, now produces both block and drain tile with latest equipment

By H. E. SWANSON

STARTING in 1939 with a single hand tamper block machine yielding a daily production of 75 units, Houston Concrete Products, Houston, Texas, now boasts a daily output of 4500 5x8x12-in. units as well as 240 ft. per hour production of drain tile. Keeping pace with the rapid growth of Houston, "the South's fastest growing city," this company is still in the process of expansion. Factors which have enabled this company to become one of the leading concrete products producers in the South are: aggressive merchandising, constant attention to efficient production methods, and addition of equipment and curing facilities to produce the best unit possible.

History

Early in 1939, Arnold Correll and John Schmelter, co-owners of Houston Concrete Products, visualizing the market for masonry units in a city which was still growing, decided to start production of concrete block. They purchased an Ideal hand tamper with which they were able to make 75 of the old style rock-faced block per day. Neither of the two men had had any experience in making block and therefore they had their early difficulties until, by visit-

ing other block plants and studying production methods, they reached the point where they were able to make a more satisfactory unit. Later, they enlisted the aid of the Pittsburgh Testing Laboratories for the proportioning of aggregates used in the mix and for testing raw materials and finished product. This service is still used.

As soon as it was found that they could produce a unit that would meet specifications, they made the rounds of local lumber yards and building materials companies to find a market for their product. The demand for concrete block was encouraging and it was soon found that they were unable to keep up with local demands. Since some of these demands were for other products, they installed a Flam vibrator later in 1939, with which stepping stones, foundation block, and building tile were produced. Then, in August of the same year, a drain tile machine was purchased, which made 4- and 6-in. drain tile for sale to local pipe companies and plumbing contractors. It soon became evident that, in order to meet the growing demand, a larger block machine would have to be in-

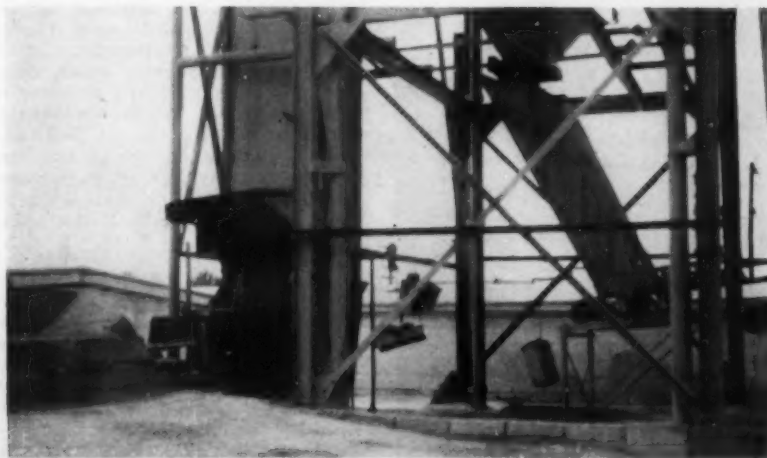
stalled, so early in 1941, a Stearns Clipper Stripper was purchased. Very shortly, this company was able to make enough block to build up a stockpile. The machine was used to make two 5x8x12-in. block per operation, or 600 block per hour. During this period of growth the modern building in which they now house their equipment was built, using block manufactured in their own plant.

To produce a more thoroughly cured product, it was decided to construct steam curing rooms. This curing would also help to eliminate chipping of block during stockpiling. In 1942, four curing rooms were built adjoining the main building. These rooms are 75 ft. long, 12 ft. wide, and 6 ft. high. The rooms were also constructed with block made at this plant. Each room has a capacity of about 3000 block. Steam curing is used the year around.

Another step taken to speed up production was the installation, in 1943, of a two-compartment Butler bin for the handling of aggregates. A weigh batcher under the bins measures the amount of aggregates sent to the mixer. Belt conveyors are used to transport the aggregates to the bins from an underground hopper and for transference of the weighed materials to the mixer. All of the machines used in the plant proper were set in line so that the concrete mix could be introduced to them by means of a traveling hopper which operates on a tram rail running over the machines. This installation, together with the Butler bin arrangement not only facilitates speed of transmission of the mix to the machines but also minimizes labor.

Plant Operation

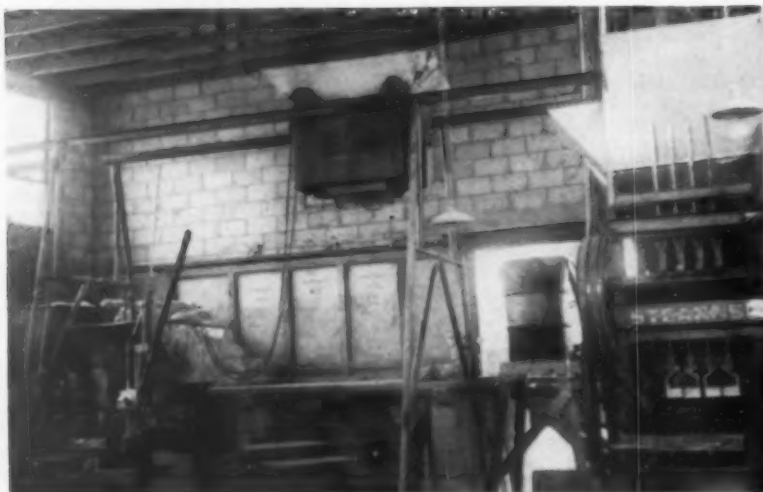
Aggregates are received locally and are hauled to the plant by truck. The trucks discharge into a receiving hopper located under a concrete runway on which the trucks back up to discharge. This hopper feeds a 24-in. belt conveyor, 18-ft. centers, which feeds the bucket elevator, 30 ft. high. This elevates the aggregates to the two-compartment bin. Each compartment has a capacity of 45 cu. yd.



Bucket elevator, left, takes aggregates to compartment bin. Chute on right feeds conveyor which takes weighed aggregate to plant mixer.



Four steam curing rooms, each with a capacity for 3000 concrete block



Traveling hopper supplies concrete to two smaller concrete block machines and drain tile machine. Large tamper block machine receives concrete from skip hoist



Drain tile machine in the center with smaller block machines on each side

The 2-cu.yd. weigh batcher receives material from the bins, and the weighed aggregates are fed from the batcher by chute to a 16-in. belt conveyor, 12-ft. centers. The belt conveyor runs through an opening in the wall of the building to the mixer. Water is added to the mixer by volume and cement by sack. The mixer has a capacity of 14 cu.ft. After mixing, a bottom discharge allows the mix to be fed to the skip hoist of the Stearns block machine. A winch pulls the skip hoist by means of a $\frac{3}{8}$ -in. cable to the top of the machine.

At this point, the mix can be introduced directly into the hopper of the Stearns, or into the traveling hopper. When the other machines are used, the traveling hopper is filled and is pulled on the tram rail manually to the machine to be fed. Bottom discharge from this hopper allows the mix to be fed to the hoppers of either the Ideal hand tamper, the Champion drain tile machine, or the Flam vibrator.

Block made on the Stearns are placed on wooden racks for transference to the curing rooms by manually operated lift trucks. The entrance to the rooms is at the plant end and the exit is directly into the storage yard. A gas-fired, 16-hp. boiler generates steam for the curing rooms. Steam, kept at 15 p.s.i. pressure, is introduced through 1 $\frac{1}{4}$ and $\frac{3}{4}$ -in. pipes to the rooms, where a temperature of 150 deg. F. is maintained. The block are cured here for a period of 14 hours. They are then moved to the storage yard, which has a capacity of 75,000 block, where they receive additional curing, since this company attempts to maintain a stock of 50,000 block at all times.

As mentioned earlier in this article, personal calls were the sole means of merchandising during the early days of this company. This is still done since it keeps up the close contact that has been achieved with the distributing companies as well as individual users. Another form of advertising is a circular which shows various units that are produced at this plant and which are kept in stock at all times. In the past three years, the plant's output has been almost entirely used on government projects. At present block are being marketed largely through contractors.

Future

Arnold Correll and John Schmelter, owners of Houston Concrete Products, feel that their company is still in the process of expansion and have plans for increasing production and adding equipment which will facilitate the present production. An electric lift truck has just been received, and a Besser VibraPac block machine has been ordered. To increase outside storage capacity, 6000 sq. ft. of yard are being paved.

Comac Builders Supply Corporation, Rochester, N. Y., furnishes concrete masonry units for large onion storage buildings

By N. D. NICHOLS



Onion storage building constructed with cinder concrete masonry

ABOUT 25 dry storage buildings have been built of lightweight concrete masonry units, in Genesee and Orleans Counties, New York, ranging in cost from \$7,000 to \$35,000. These farm structures required approximately 200,000 12-in. units. In New York State this is big farm business, and it resulted from a sales promotion program built up over a period of years.

A. C. McGuire, better known as "Mac," cashed in on sales experience obtained while traveling for a nationally known ginger ale concern, for as soon as he entered the concrete masonry field he made sure that all of his old friends and customers knew that he was in the block business. He traveled the rural areas within 100 miles of his plant, and in the last nine years has built up a valuable list of customers and friends that tell others to call on "Mac," if they are thinking of building. This list includes store proprietors, garage mechanics, farmers, grocers, engineers, architects, housewives, railroad men and many others. One of these good friends advised Charles Walker to talk with "Mac."

In 1941, Charles Walker, one of the leading onion growers in this area, had a bumper crop at Elba, N. Y., which required storage until a better market price was reached. His old wooden frame building was inadequate and not too efficient, and required constant maintenance, so

he decided to investigate the possibility of a better, more efficient building. In the past, storage buildings were built of wood, because the farmer generally had a wood lot where he produced his own lumber, or the first cost of lumber seemed to be lowest. In addition, the Department of Agriculture recommended wood because all farmers were familiar with this type of construction and could erect the buildings themselves.

Mr. Walker told "Mac" that he came to the "Expert" for advice and suggestions for the construction of his building. "Mac" denied being an expert, but offered to secure all available data on the subject of storage buildings and would then discuss the merits of designs and materials. "Mac" knew that if he could develop a better storage design than existed in this area, more buildings would be erected in the next few years when farmers were producing large crops for the war effort. This market would help balance the decreased market for blocks for housing, so he wrote the Portland Cement Association, the leading manufacturers of insulation and others. He consulted with specialists and assembled his facts for a conference.

After several meetings plans were started to develop a building having low maintenance, providing accessible storage, with efficient insulation to protect a \$30,000 onion crop. Floor area was established for Mr. Walker's building at 32- x 100-ft. so that roof trusses made of 2- x 6-in. rafters, 24-in. centers, could be used for economical framing. The wall height was first set at 16 ft., but was increased to 18 ft. as the crates were handled with power lift machines. Attached to the main building is a packing room 20 ft. by 24 ft. and 12 ft. high.

Construction Details

The foundation walls were made of 12-in. concrete blocks laid up to grade on a footing of poured con-

crete 24 in. wide and 20 in. deep that contained reinforcing rods to prevent cracks due to possible settlement. The main walls are built of 12-in. cinder block, buttressed with pilasters approximately 13-ft. centers. Construction details and provisions for insulation are shown in the accompanying drawing.

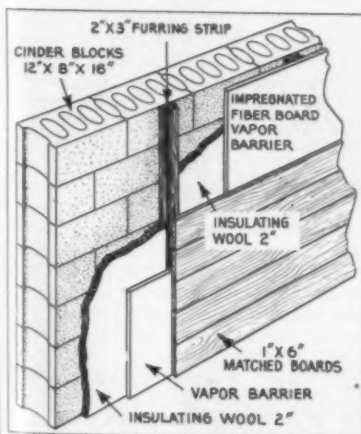
In spite of having a new building, Mr. Walker was forced to store some of his crops in commercial storage buildings. He said, "It cost me 24c per hundred to store onions this past year including crate rental, and on removal of my onions I found that their quality could not compare with those kept in my cinder concrete masonry building." He is so pleased that he built an addition so that he would not have to use commercial facilities again.

Such news travels fast and other farmers visited Mr. Walker's buildings. His enthusiastic endorsement of concrete masonry construction carried considerable weight as he has a reputation for being one of the better producers in this area, and about 25 farmers have built similar storage structures and others are to be built this summer. Light-weight masonry for farm buildings here are a must for those farmers in this area who are looking for low maintenance and efficiency.

"Mac" says, "If you want to sell concrete masonry, you must know and call on your neighbors, and my neighbors are not just in the City of Rochester; they are within a 100 mile radius of my new plant." "Mac's" new products plant has been completed and he is ready for the demands of his neighbors now and is ready for the possible Post War Construction Boom.

Open Products Plant

STEWART & NATTINGER CONCRETE PRODUCTS Co., Clinton, Mo., is a new enterprise which is to be owned and operated by Jack Steward and Ralph Nattinger. A new plant is being built at 210 S. Main street.



Construction details, showing insulation

Concrete Pipe

PIONEERS in the Pipe Industry

By M. W. LOVING*

MORE than four million tons of concrete pipe and reinforced concrete pipe were produced in the United States in 1942. It was used for building sewers, culverts and drainage systems for airports, arsenals, cantonments, internment camps, access roads for defense industries, pressure lines for water supply, sewerage force mains, irrigation systems, galleries for heating systems and many other utilities required for war. In 1917-18 the industry was in its infancy, from a national standpoint, and our guess (I was in the Army) is that less than one hundred thousand tons of concrete pipe was produced in this country during World War I.

While it is true that concrete pipe was first used in this country in 1842 for a sewer at Mohawk, N. Y., and in many New England and Mid-Western cities from 50 to 70 years ago, the industry did not get into its stride until after 1920, when the first tentative specifications for concrete sewer pipe were adopted by the American Society for Testing Materials. This specification gave engineers and other users, for the first time, a yardstick to measure quality and to protect them against irresponsible manufacturers. The concrete pipe that was properly made prior to 1920, with few exceptions, is in excellent condition today. Without

recognized specification requirements, some of the early pipe failed in service because it was improperly made; the technical reasons are described somewhat in detail, by the writer in *Rock Products* for March, 1945.

The late W. D. Goodman, Saginaw, Mich., was a pioneer in the manufacture and sale of machine-tamped concrete sewer pipe from about 1912 through 1924; the late John L. Zeidler, Muscatine, Iowa, pioneered the manufacture and sale of concrete sewer pipe made by the packer-head process during the same period. The late G. F. Lillie, Fremont, Nebr., was another pioneer of the same kind of concrete pipe. C. H. Bullen, now of Chicago, pioneered machine-tamped concrete sewer and culvert pipe in Portland, Ore.; Ernest F. Bent, Los Angeles, Calif., pioneered the packer-head process from about 1909 to 1927. The late Ned A. Epps, Houston, Texas, pioneered concrete sewer pipe in South Texas. The late Alfred N. Shearman, Knoxville, Tenn., pioneered the concrete pipe industry from about 1912 through 1933 in the Southeast.

It was my privilege to work with these men, and many others, in developing standard methods of manufacture and enforcement of quality standards; this included developing, what is known today, as the Standard Specification for Concrete Sewer Pipe A.S.T.M. Designation, C-14-41. C. F. Bunte, Pittsburgh, Penn., and



Fig. 1. Left to right: The late Geo. T. Hammond, Brooklyn, N. Y.; Edward S. Rankin, Newark, N. J., and Asa E. Phillips, Washington, D. C., prominent engineer members of Committee C-4, A. S. T. M., Atlantic City, N. J., taken in 1929

the writer were on many occasions the only members of A.S.T.M. Committee C-4 on clay and concrete sewer pipe who attended all meetings from 1919 to 1924, when standard specifications for both clay and concrete sewer pipe were first adopted by the Society.

The Committee was then composed of seven clay and seven concrete "producer" members and about 15 of the leading sewerage engineers of the country. The chairman of the Committee was the late Dr. Rudolph Hering, eminent sewerage authority of New York. The late Harrison P. Eddy, Boston; the late Asa E. Phillips, Washington, D. C.; the late Edward S. Rankin, Newark, N. J.; the late George T. Hammond, Brooklyn, N. Y.; A. J. Provost, New York, N. Y., and Dean Anson Marston, Iowa State College, Ames, Iowa, served as "consumer" members of Committee C-4.

Fight Unfair Competition

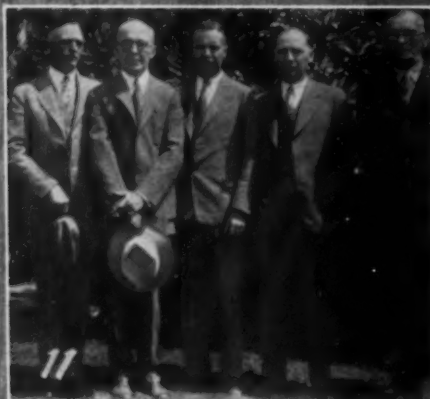
From 1912 through 1919 the clay pipe members of Committee C-4 had, by one means or the other, prevented the adoption of the tentative standards for both clay and concrete sewer pipe. But through the efforts of the engineer members and the concrete pipe representatives, the first tentative specification for both clay and concrete pipe, as previously mentioned, was adopted in 1920. From 1920 through 1923 the seven clay pipe members of the Committee attempted to introduce a clause in both specifications requiring an acid test as a basis of acceptance, when both kinds of pipe were used for constructing sanitary sewers. The concrete pipe members and some of the engineers opposed this action because it was and is a known fact that the sewage of most cities is, like the water supply, slightly alkaline and not acid; so the question naturally arose as to why an acid test for clay or concrete sewer pipe was necessary

(Continued on page 114)



Fig. 2. Left to right: W. J. Schlick, Dean Anson Marston and Prof. T. R. Agg. Iowa State College, Ames, Iowa

Snapshots of Some of the Industry's Founders



Some of the early pioneers in concrete pipe manufacture. 3. C. H. Bullen, Chicago, formerly of Portland, Ore.; 4. Ernest F. Bent, Los Angeles, Calif.; 5. The late Alfred N. Shearman, Knoxville, Tenn.; 6. The late Geo. F. Lillie, Fremont, Nebr.; 7. The late Ned A. Epps, Houston, Texas; 8. Wm. J. McCracken, Miami, Fla., and Sioux City, Iowa; 9. Howard Schurmann, Indianapolis, Ind.; 10. M. K. Billson, Honolulu, Hawaii, who introduced pipe in that territory; 11. California pioneers, taken in 1928, Gilbert D. Williamson, Yuba City, the late John Van Cleave, Exeter, H. W. Chutter, Fresno, H. A. Weigun, San Jose, and the late Henry Sholten, Sunnyvale, Calif.; 12. A. W. Clark, Vancouver, British Columbia, discussing the merits of centrifugal concrete pipe with J. Porter, sewer engineer, Vancouver, in 1928

from a practical engineering standpoint. The seven clay representatives, voting with some of the engineers, came within one vote of putting this acid test over, at a meeting of Committee C-14 in 1923. But the two specifications were advanced to Standard in 1924 with an acid test in the clay pipe specifications only.

During this period it was my duty to secure, in advance of all meetings, proxies of the concrete pipe representatives who did not always attend meetings so that with Mr. Buente, we always had seven votes at every meeting of Committee C-4. The clay pipe men had their seven votes at every meeting of the Committee. On many occasions we would have men taking proxies who knew nothing about the subject but voted the straight ticket. The clay and concrete representatives seldom voted the same way, except on adjournment of the meetings.

A.S.T.M. Specifications

In June, 1923, when the acid test missed our specification by one vote, at a meeting of Committee C-4 at Atlantic City, N. J., the late John L. Zeidler was missing at the critical moment. Frantically I asked the chairman if the vote could be delayed until we could find Mr. Zeidler, who had traveled from Joplin, Mo., to attend the meeting. The chairman allowed 15 minutes. I rushed out on the board walk and found Mr. Zeidler taking in the sights. When I practically picked him up and carried him into the Committee room, he said, "Mike, I was trying to find a place to have my shoes half-soled." John was a great fellow!

From 1920 through 1929, with the cooperation of concrete pipe manufacturers, we succeeded in opening the specifications of many cities throughout this country and Canada to concrete sewer pipe from 4 to 24 in. in diameter for the construction of sanitary and combined sewers. Each case was a battle royal between the concrete and clay pipe interests. Because they had enjoyed a virtual monopoly of the sewer pipe business in many cities of the country, the clay pipe interests were naturally anxious for this fortunate condition to continue and did everything in their power to disparage concrete and concrete pipe, not alone for sewer construction, but for drains as well. The stock arguments were: "sewer acids, gases and alkali." Whenever concrete pipe sewers failed in any city of this country, they were usually exposed, the concrete pipe taken up and photographed. Someone connected with the city was usually persuaded to write or sign a prepared statement for the newspapers which, with the close-up pictures of the concrete pipe were broadcast to all city officials in all sections of this country wherever sewerage

projects were in prospect.

Moreover, on large sewerage improvements or "lettings," men representing the clay pipe interests, usually trade association representatives, spent all of their time in the conduct of a smear campaign against concrete pipe, but of course, never mentioned their own failures. It is surprising how many experienced engineers were misled by this commercial sales propaganda. Our arguments were that the sewage is the spent water supply of a municipality and like the water supply, it was slightly alkaline and not acid. Condition surveys of existing concrete sewers that had been in service many years were made in cities of the country, which together with the specimens of old concrete pipe that had been in service as sanitary sewers for more than 50 years, were used to convince the engineers that concrete pipe was a suitable material for constructing sanitary sewers. Moreover, we pointed out that the leading sewerage authorities, including the late Dr. Hering, previously mentioned, were among the first to advocate the use of concrete for the construction of sewers in this country, based on successful experience with it in European cities for long periods of time.

These early authorities recognized, as we have, to the present day, that there are certain conditions under which clay and concrete pipe should not be used and these technical exceptions were called to the attention of engineers and under no circumstances would we recommend concrete or concrete pipe for service under conditions for which it was not suited. As a consequence of this broad, constructive policy, we have been able to extend the market for concrete sewer pipe in practically all sections of the United States and Canada.

Reinforced concrete pipe was first developed in France prior to 1895, and introduced in this country about 1905. Five trunk line railroads leading out of Chicago, were the first to use reinforced concrete culvert pipe after they sponsored research at the University of Illinois, under the direction of the late Arthur N. Talbot, from 1906 to 1908. In 1919 the Joint Concrete Culvert Pipe Committee was organized to prepare standard specifications for reinforced concrete culvert pipe for railroad and highway drainage structures. The Committee consisted of two representatives each of the following organizations: American Society of Civil Engineers, American Railway Engineering Association, Office of Public Roads, U. S. Department of Agriculture, American Association of State Highway Officials, American Concrete Institute, American Concrete Pipe Association. The writer served as secretary of this committee from 1921 to 1930, when

this work was taken over by Committee C-13 on concrete pipe for the American Society for Testing Materials. The prominent engineers who served on this committee, the chairman of which was Dean Anson Marston, Iowa State College, initiated research and condition surveys of existing concrete pipe culverts and the report of the committee of 1926 and 1928 was the basis for the Standard Specification for Reinforced Concrete Culvert pipe A.S.T.M. Designation C-76-41. T. R. Agg, professor of Highway Engineering and W. J. Schlick, engineer, Engineering Experimental Station, Iowa State College, Ames, Iowa, were of great help in the work of the Joint Concrete Culvert Pipe Committee and later, when the work of this committee was taken over by A.S.T.M. Committee C-13, on concrete pipe in 1930. The 1928 report of the Joint Concrete Culvert Pipe Committee was adopted as a tentative specification and known as Tentative Specifications for Reinforced Concrete Culvert Pipe, A.S.T.M. Designation C-76-30T. Continued research and condition surveys of existing reinforced concrete pipe culverts made in 1931 were used as a basis for revising the specification until they were adopted by the A.S.T.M. as Standard in 1937. Editorial and other revisions were made in this specification in 1940, and they were advanced to Standard in 1941 and known as Standard Specifications for Reinforced Concrete Culvert Pipe, A.S.T.M. Designation C-76-41.

Reinforced Concrete Pipe

Reinforced concrete sewer pipe was introduced in this country and Canada about 1905 and was used to a limited extent, at first, for building storm sewers and drains and for sanitary and combined sewers. It had to compete with circular brick and monolithic concrete (built in place) because so many engineers were favorable to these two types of construction and the cost in place was relatively low. For this principal reason, the early reinforced concrete sewer pipe was usually made on or near the site of the work to save transportation costs and to use local labor and materials; the last was a strong selling argument.

The several firms that manufactured reinforced concrete sewer pipe had special, patented joints and as a consequence the manufacturers' specifications for this class of pipe were about the same as to design requirements—shell thickness, steel reinforcement, recommended concrete mixtures, etc. But the joints were all different. Among the most popular were the Independent Joint, Lock Joint and the Core Joint. The bell and spigot joint and the ship-lap joint, known throughout the industry

(Continued on page 116)



... and now again!
Fourth "E" awarded
March 10, 1945.



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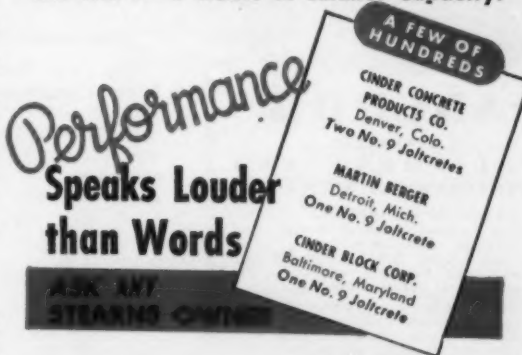
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STUDY THESE SPECIFICATIONS:

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• **Recent Improvements:** Automatic Carriage Drive mechanically delivers blocks to Offbearer. Power Offbearer conveys blocks to racks. Both eliminate hand labor. Like all Stearns improvements these can be added to present Joltcretes.

Write today for new Joltcrete folder illustrating and describing the details of No. 9 and No. 7—a model of smaller capacity.



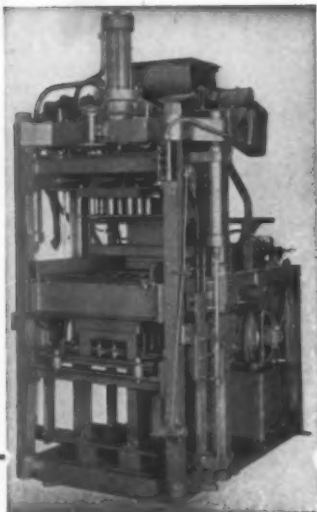
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Complete EQUIPMENT AND ENGINEERING SERVICE

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Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns Jolcrete, Stearns mixers, pallets, Straubenz Oscillating attachments, etc.
Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mchy. Co.
1191 Fairview Ave., Columbus 8, Ohio

Concrete Pipe Pioneers

(Continued from page 114)

as the tongue-and-groove joint, were not, to our knowledge, ever patented.

Among the pioneers of reinforced concrete sewer pipe in this country was the late N. D. Whitman of Chicago and later of Los Angeles and Howard Schurmann, Indianapolis, Ind.; we are now speaking of the period from 1905 to 1920. Mr. Whitman, whom I first met and worked with in 1916 was one of the ablest engineers I ever met and a thorough gentleman. He was a graduate of the Massachusetts Institute of Technology, and in the last years of his life he made a valuable contribution to the industry in developing and improving the quality of reinforced concrete pipe, manufactured by the centrifugal process in California. He was largely responsible for the design and manufacture of reinforced concrete pressure pipe, ranging in diameter from 123 to 152 in., and in lengths of 12 ft. for the Colorado River Aqueduct in 1936; this pipe has been referred to in several of my articles published in *Rock Products*.

Mr. Schurmann, a graduate of Purdue University, first engaged in the manufacture of reinforced concrete sewer pipe in 1905, at Jackson, Mich. He was associated with Mr. Whitman in that venture. I first met him in 1920, when I functioned as an expert witness in a legal action at Canton, Ohio, when a group interested in the construction of brick sewers tried to delete reinforced concrete sewer pipe from the city specifications. Since that time I have worked with him in many sections of this country and it can be said without contradiction that he was one of the outstanding salesmen of the concrete pipe industry. Many times prior to 1930, I was asked by engineers and other public officials, to prepare specifications for reinforced concrete sewer pipe, after Mr. Schurmann had sold the pipe.

Overcome "Joint" Problem

The first specifications for reinforced concrete sewer pipe were adopted as tentative by the American Concrete Institute in 1925. This was one of the most difficult jobs a committee ever undertook. Each producer member favored his kind of joint, naturally, and by that time reinforced concrete pipe was being manufactured in this country by the machine-tamped and the centrifugal processes.

Because the concrete made by the latter two methods prior to 1928 was stronger in compression, than that made by the so-called "field cast method"; those who made machine-tamped and centrifugal pipe demanded thinner shells, but with a slight increase in the steel reinforcement, than was required for field cast pipe. The A.C.I. Committee

solved the complicated joint problem by specifying the engineering requirements for the joint rather than its design:

"Joints 14. The ends of reinforced concrete sewer pipe shall be so formed that when the pipe are laid together and the joints cemented, they will make a continuous and uniform line of pipe with a smooth and regular interior surface. The joints shall be of such design as will permit effective cementing to reduce leakage and infiltration to a satisfactory minimum and to permit placement without appreciable irregularities in the flow line."

Thus, each manufacturer could sell his own joint to the consumer. But this clause had a profound influence in a number of states, including Illinois, where special assessment laws prohibit patented joints; the "or equal clause" could not make the grade. On a number of very large sewerage improvements in Illinois, where each item in the design is defined in legal language, the whole proceedings were thrown out of court when and if some patented joint, somehow got specified. Several very prominent engineers told me that unless the manufacturers refrain from this practice they would specify monolithic concrete and brick construction exclusively.

In 1930, the Executive Committee of the A.S.T.M., appointed a new committee, C-13, on concrete pipe. Some of the engineers and all of the producer members of the old Committee C-4, were assigned to the new committee. The late Asa E. Phillips, consulting engineer, Washington, D. C., was its first chairman. The writer was elected secretary. The work of the Joint Concrete Culvert Pipe Committee, as previously said, was taken over and also the work of the A.C.I. Committee on reinforced concrete sewer pipe.

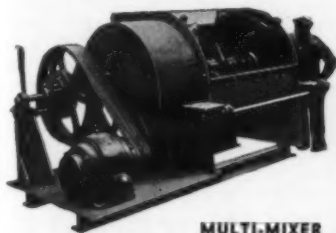
Condition surveys of existing reinforced concrete sewer pipe lines were made in 1929, by a representative of the committee and of the city or industrial plant in which the sewer was constructed. Actually, 22 miles of sewers were examined that year, ranging in diameters from 36 to 108 in. In 1931, H. C. Delzell, of Chicago and C. M. Howard of Seattle, Wash., examined existing reinforced concrete pipe culverts in diameters ranging from 36 to 84 in. Mr. Delzell's work was in Pennsylvania, New Jersey and western Maryland; Mr. Howard examined culverts in Oregon, Washington and British Columbia. Both surveys were very carefully made and the condition of each pipe was described in detail. Lock level surveys were made of the cross-section of each fill over the culverts, so that from the field notes of the inspectors, the writer could plot the position of and the height of the fill over each pipe. With these surveys and with test data furnished by engi-

(Continued on page 118)

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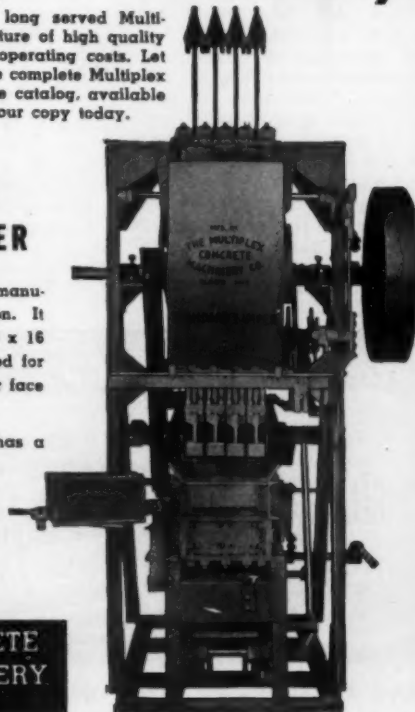
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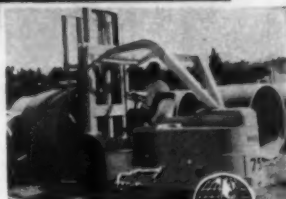
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neers and manufacturers from all sections of the country, the specifications were finally issued as tentative in 1934. In 1935, the Standard Specifications for Reinforced Concrete Sewer Pipe A.S.T.M. Designation C-75-35 were adopted. In 1937, the Standard Specifications for Reinforced Concrete Culvert Pipe A.S.T.M. Designation C-76-37 were adopted. Because the two specifications were prepared by separate sub-committees of Committee C-13, it was necessary in 1940 to make editorial changes in many sections of the specifications covering the same subjects. This was accomplished in 1940, and the editorial changes were published as tentative for one year and were in-

corporated in both specifications in 1941.

Without this pioneering, constructive and cooperative work by engineers and manufacturers, the industry would never have been able to sell four million tons of concrete pipe in 1942.

Future Developments

Future developments in the concrete pipe industry will, in my opinion, be in the direction of prestressed steel reinforcement and precompressed concrete. Oil tempered spring steel wire, wound under high tension,

†Concrete-Steel Pressure Pipe for Water Supply, Rock Products, October, 1944.

on concrete pipe of high compressive strength, will, as has already been demonstrated by Miller† and others in this country, France and Germany, produce pipe of extraordinary strength to resist great external loading. More important, this new development will open a great market to concrete pressure pipe for water supply, that has all of the advantages and none of the disadvantages of cast iron and steel pressure pipe. Natural and portland cement mortar has been used since 1836 in France and 1843 in the United States for protecting cast iron, wrought iron and steel pipe from corrosion of active (aggressive) waters. It is used today for that purpose.



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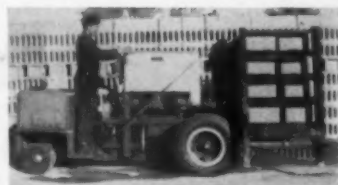
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The purpose of the Chemists' Contest is not to make awards for the most monumental types of research performed. Awards will be judged on the basis of the usefulness of your observations or work to your profession . . . on its originality . . . on its value in stimulating other thought or work.

A jury of qualified, unbiased men will judge the articles contributed. Prize-winning articles will be published in the August Cement Issue of ROCK PRODUCTS. In addition to the award money, winners will be paid regular space rates for publication of their entries in the August Cement Number. All other entries that the Editors consider suitable for publication will be paid for at our regular space rates.

Remember, the contest closes July 10. Your entry need not be long, or involved, to qualify for the prize money. So plan now to participate in this contest—and send your entry by July 10.

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Rules of the Chemists' Contest are simple. Your entry can be on any subject of current interest . . . on research projects, work on product quality, sampling and testing, control of operations, the use of grinding aids, air-entrainment, laboratory procedure, practical short cuts and devices for chemists, grinding, or any other chemical process associated with the manufacture of portland cement. All entries must be mailed by July 10.

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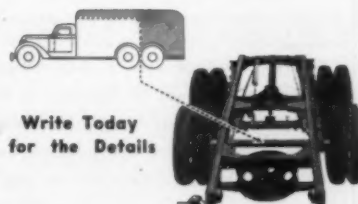
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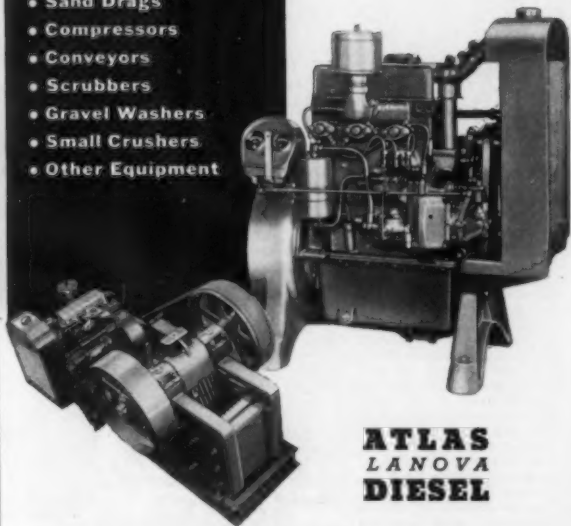


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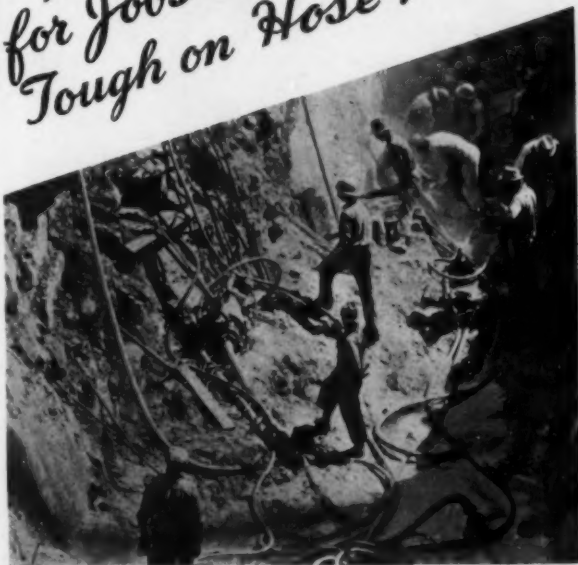
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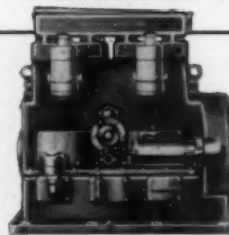
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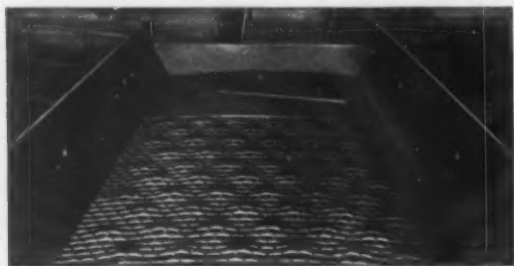
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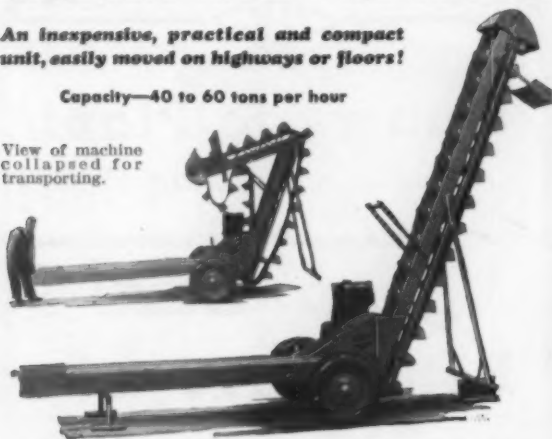
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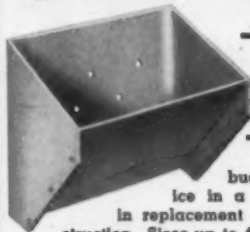
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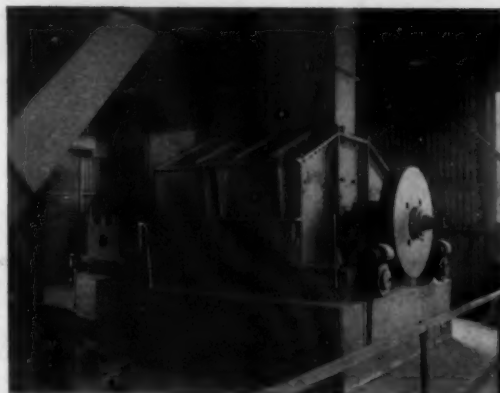
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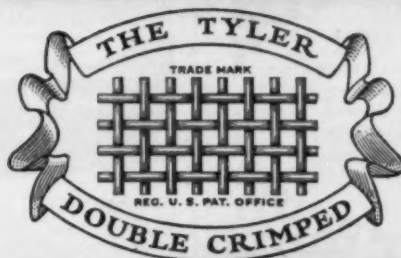
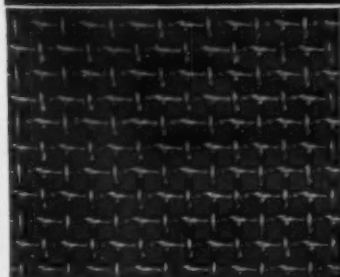
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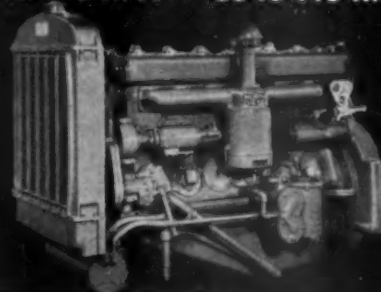
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42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

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18"	6	10"
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Sand and Gravel Plant, including Jaw Crusher, Gyratory Crusher, Conveyors, Vibrating Screens, Sand Classifiers, Extra Heavy Scrubber, Water Pumps, Sand Pumps, Feed-Weights, Weightometers, Trestle and Tripper and Auxiliary Equipment.

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All of this equipment is in good shape, ready to go to work. Price \$3000 at our plant.

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Traylor "BULLDOG" 15" Gyratory crusher
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Jeffrey 24"x20" type "B" hammermill
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8 tons of steel crushing balls, 1" to 2"
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3 steel pontoons, 4'x4'1/4" of 1/2" plate.

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Roll, 54x24, 54x20, 48x36, 36x24.
All-Chalmers 42" Gyratory.
Gyratory Crusher: K.V.S. 36, 37-R, 40; 32, 8A.
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Complete Rock Crushing, Sand and Gravel Plants.

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Block machine purchased June 1942, same as new.

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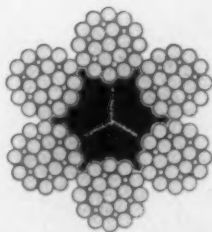
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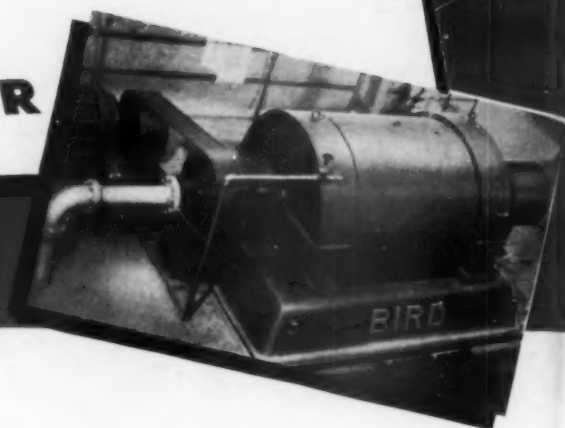
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24 REASONS for making the next one a **LORAIN!**



NOTE: All Lorain machines are fully and easily convertible for use as cranes, clamshells, draglines, shovels and backdiggers. Don't buy a single-purpose machine; keep future jobs in mind. One machine—one investment—can do a wide variety of jobs for extra profits!

1. Center Drive turntable.
2. Permits concentrating power on any one operation.
3. Permits spreading power for high-speed simultaneous operations.
4. Two-piece swing drums, roller bearing mounted, reversible bands.
5. Extra wide crowd clutch, roller bearing mounted.
6. Hydraulic coupling—no stall, no shock, no loading; (used on L 82 and L 820).
7. Center "Chain" Drive crawler.
8. Two travel speeds either direction.
9. Steers either direction.
10. Safety travel and tread lock.
11. Mechanism runs in oil bath.
12. Generous underneath clearances.
13. Centralized lubrication.
14. Wider treads.
15. All-welded shovel boom (strength; all-steel; torsion-resisting).
16. All-steel welded dipper stick.
17. Dipper door stops to protect stick.
18. "Elbow action" power dipper trip.
19. Simultaneous hoist, swing and travel (or boom derricking).
20. High-speed boom hoist—power controlled boom derricking and lowering.
21. "Cable-Miser" fairlead with interlocking, geared sheaves.
22. Bolted butt crane boom connections, easy and quick to assemble.
23. All-purpose Crane Boom Head—6 part reeving with no top block; greater vertical reaches.
24. Backdigger Boom—with controlled tilting dipper; digs a vertical wall, a level floor, dumps exactly where wanted.

Reg. Trade Mark
thew. Lorain

THE
THEW SHOVEL COMPANY
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

"Any other method of Rock Drilling is Unthinkable" says

The E. L. Smith Division,
Rock of Ages Corporation



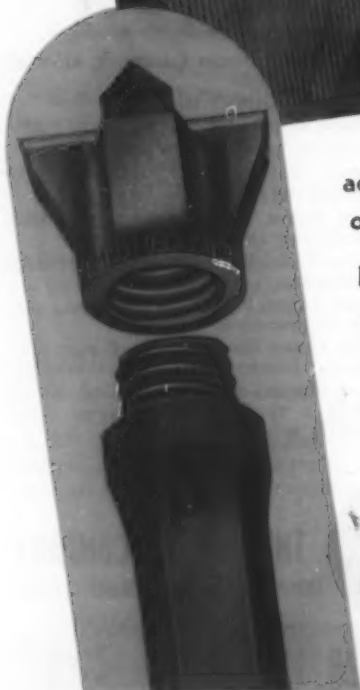
This is the twelfth year of Timken Rock Bit experience for E. L. Smith Division, Rock of Ages Corporation, granite quarries of Barre, Vermont.

When they first began to use Timken Bits, J. Wendell Smith, General Superintendent, admits there was a feeling of "quiet skepticism" but now, he says "any other method of rock drilling is unthinkable."

In addition to the characteristic speed and economy of Timken Bits, quarriers of building and monumental stone enjoy a tremendous advantage in constant gauge drilling. The photographs reproduced here, taken in the E. L. Smith Division quarry, show examples of constant gauge drilling made possible with Timken Bits.

Are you using Timken Bits in *your* quarry? If not, you are overlooking savings through reduced drilling costs. Try Timken Bits now—it will pay you. Write for name of nearest Authorized Distributor. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROCK BITS



NORTHWEST in Rock
Everywhere

AND NO NORTHWEST WELDED SHOVEL
BOOM has ever failed!



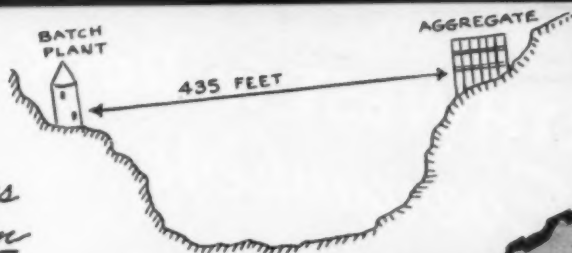
*and when
you have a real
Rock Shovel
you won't have
to worry about
output in dirt.*

7 HAT'S something else for you to think about in your post war planning! Better built—cheaper to operate—a Real Rock Shovel and if you have a Real Rock Shovel you'll have high output in any kind of digging.

NORTHWEST ENGINEERING COMPANY
1920 Steger Bldg. • 28 E. Jackson Blvd., Chicago 4, Illinois

NORTHWEST

*The Problem —
to move sized
aggregate to batch
mixing plant across
435 ft wide Canyon*



**S-A Engineering
PRODUCED THIS
Efficient Answer**

● Out of Stephens-Adamson's 44 year background and S-A engineers' inventive ability, an effective solution can be found for virtually any handling problem, large or small.

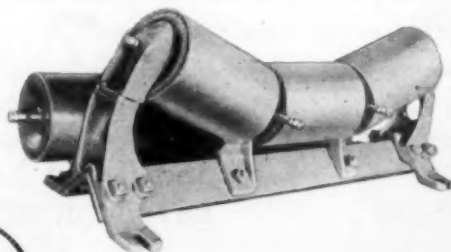
In the case shown, involving a complete plant for producing concrete for a great irrigation dam, S-A engineers designed and built the entire plant.

The key to efficiency here lies in the long S-A Belt Conveyor which takes sized aggregate from various bins 435 feet across the canyon to the batch mixing plant. This belt, operating on a high trestle, delivers aggregate through a distributing turnhead into the proper bin compartments of batching plant.

All other operations . . . crushing, screening and washing gravel . . . are accomplished by S-A equipment. Find out how *your* operations can benefit by S-A Engineering.



S-A Scalping, Screening, and Washing Equipment prepares sand and gravel for the 435 foot ride across canyon to the batching plant where concrete is produced.



The canyon-spanning S-A Belt Conveyor is equipped with famous Simplex-Type rollers like the shown here.

STEPHEN S-ADAMSON
7 RIDGEWAY AVENUE, AURORA, ILLINOIS MFG. CO. LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

Designers and Manufacturers of All Types of
BULK MATERIAL HANDLING EQUIPMENT



A Big One For A Big Job
or
A Little One For A Little Job



WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

Whatever your requirements—be they large or small, Traylor engineers can design and build a kiln, cooler or dryer to do the work for you. Into each of these machines are built many ideas, represented by devices to increase efficiency and decrease costs.

These ideas are based on our engineers' intimate knowledge of the work to be done, a knowledge gained by constant study and experience.

Traylor Rotary Kilns, Coolers and Dryers in use in the cement, lime and process industries now total over 45000 feet in length of an average diameter of eight and one-half feet.

Ask our representative to call to discuss these machines with you.

Write for our Bulletin No. 115

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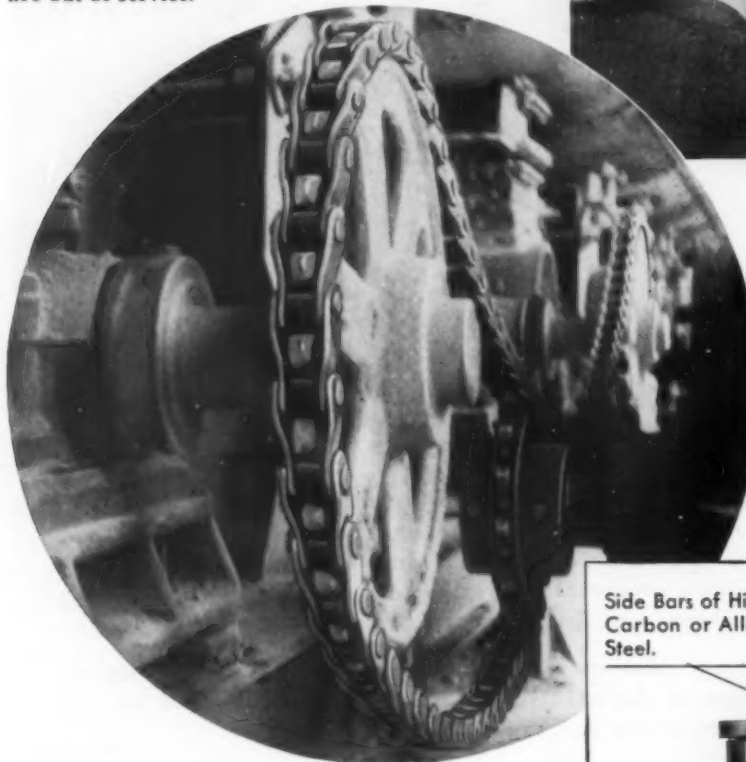
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Export Department—104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Rio de Janeiro, Buenos Aires, Santiago, Antofagasta, Oruro, Montevideo, La Paz

IT GETS PUNISHED BECAUSE IT'S EXTRA GOOD!

① YES, HERE'S CHAIN BELT that's so extra good we recommend it for punishing service. Tough operating conditions . . . heavy loads . . . shocks . . . Rex Chabelco steel chain belts take them right in stride. They keep going long after ordinary chains are out of service.



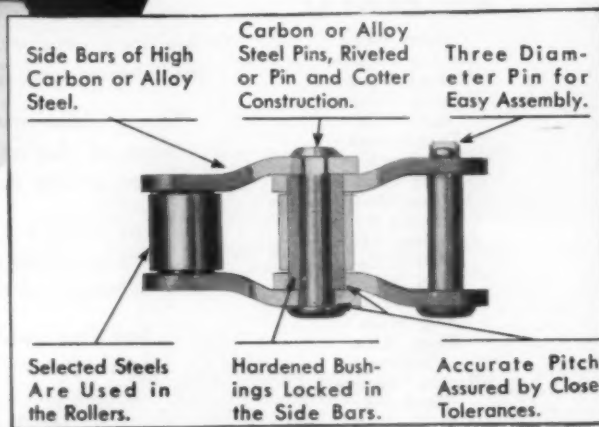
③ HERE'S THE ANSWER. Take a good look at the cross-section of this Chabelco link. Note particularly the three-diameter pin. See how its milled flat end is locked in the side bar. Notice the offset side bar construction. Heavy force fits of precision machined parts result in the finest quality chains.

* * * *

Rex Chabelco steel chain belts are the answer to drive and conveyor problems where strength and long life are essential. The Rex Man will help you with your chain belt application problems. And for engineering data on Rex chain belts, ask for the 768-page catalog, No. 444. Chain Belt Company, 1649 W. Bruce St., Milwaukee 4, Wis.



② FOR TOUGH SERVICE CONDITIONS, the chain operation on this conveyor drive is hard to beat. Dust, grit, and shock loads really test a chain's mettle. But the Rex steel chain belts driving the conveyor keep right on rolling . . . transmitting positive power and carrying the load smoothly and efficiently. But what makes them so tough?



CHAIN BELTS

Manufactured in every available type for the positive transmission of power, timing of operations and conveying of materials.

CHAIN BELT COMPANY OF MILWAUKEE

Rex Chain Belt and Transmission Division, Rex Conveyor and Process Equipment Division, Milwaukee 4, Wisconsin • Baldwin-Duckworth Division, Springfield 2, Massachusetts

*Ready
for the
rough stuff*

REDWING H CORD AIR HOSE



THERE'S no tougher job for air hose than service in quarries or on big construction projects. It's got to be plenty rugged to take the abuse of being yanked over jagged surfaces, smashed by falling rocks, dragged around razor-sharp corners. That's why Goodyear Redwing H Cord Air Hose is first choice for all heavy-duty jobs.

Here's an air carrier that's tough, willing and able to stand the gaff of the most punishing air hose jobs. Redwing has always been top quality—and now it's even better than it ever was before.

Why? Because Redwing is now built of a special synthetic rubber that is both oil- and weather-resisting. Its tube won't flake off and clog tools and its cover won't crack from exposure to heat or cold. What's more—the synthetic used in building Redwing is highly resistant to both abrasion and cutting—the kind of material that takes the heaviest-duty jobs right in its stride. And—while Redwing is extremely flexible, it won't kink or won't strangle tools or equipment.

Redwing H Cord Air Hose is doing yeo-

man duty in shipyards, steel mills, quarries, mines, heavy war industries of all kinds. Wherever it's in use, it is giving an outstanding account of itself, smoothing the flow of production and keeping maintenance costs and need for replacement at the minimum. Try it yourself—

Redwing—T. M. The Goodyear Tire & Rubber Company

and you'll soon learn why users are so enthusiastic about this heavy-duty hose.

Made in continuous lengths, in seven sizes up to 1½" diameter. Order from the G.T.M.—Goodyear Technical Man—or phone your nearest Goodyear Industrial Rubber Products Distributor.

GOODYEAR INDUSTRIAL RUBBER PRODUCTS



-Specified

Redwing H Cord Air Hose
for Heavy-Duty Service



A Highest quality synthetic rubber tube, non-porous, impermeable to oil

B Multiple braids of cabled cotton cord give high safety factor

C Heavy-gauge, high-tensile cover resistant to cutting; non-oxidizing

GOODYEAR
THE GREATEST NAME IN RUBBER

ALL OUT FOR THE MIGHTY 7TH — BUY MORE WAR

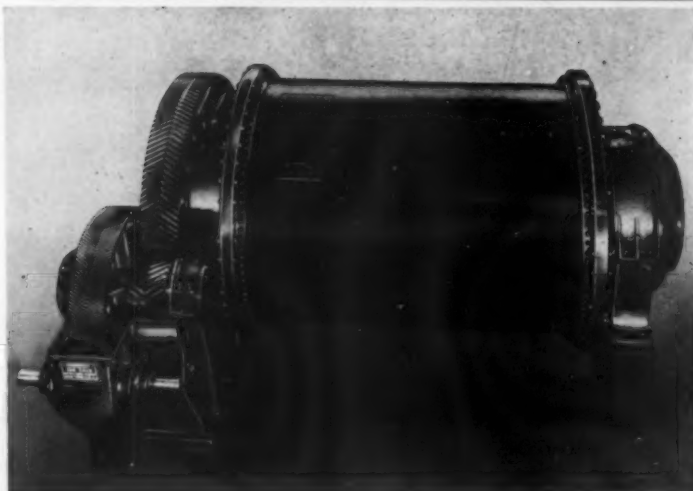
KVS Engineering

GIVES PLANTS BETTER PERFORMANCE

It is axiomatic that for efficient plant operation each and every machine must do its part well. That is why KVS Engineering makes Kennedy machinery a strong link in the chain of efficient plant performance. Standard assemblies are of highest quality; and by recourse to design improvements in critical places, each individual Kennedy unit will contribute toward better performance in your plant.

KVS

KILNS
COOLERS
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WASHERS
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THE ONLY COMPLETELY INTEGRAL GEAR-DRIVEN TUBE MILL

• The patented design of the Kennedy Integral Gear-Driven Tube Mills makes it impossible to misalign or set wrong the gears and greatly reduces power required to drive the mill.

With these and other features such as forced feed lubrication, sound absorbing elements, electric eye mill level, control, Kennedy In-

tegral Gear-Driven Tube Mills represent the most advanced and versatile type of mill made. They are used widely as rod and ball mills—for wet and dry grinding and for air sweeping of coal, cement, clinker and raw materials.



COMPLETE CEMENT, ROCK CRUSHING, SAND
AND GRAVEL, LIME AND DOLOMITE PLANTS

Write Today —

for our catalog and description on these and other
types of KENNEDY machinery.

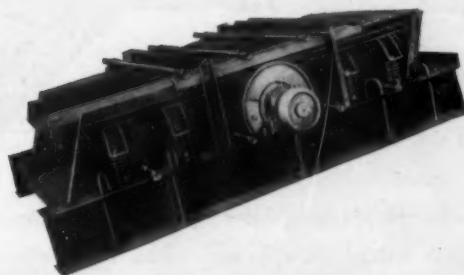
KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

BETTER PERFORMANCE *with* KENNEDY BALL BEARING GEARLESS CRUSHERS

● Better performance resulting from the design improvements in this crusher can be expressed in terms of results obtained by users—80% savings in cost of maintenance with 50% saving in power required.

In the Kennedy Ball Bearing Gearless Crusher the synchronous motor driving the crusher is built right into the pulley assembly. Power is applied only for crushing; none is wasted in belts or gears. The motor runs on ball bearings and is continuously lubricated by a force feed lubricating system (shown in color in the illustration).

Better performance is also due to several other features of this crusher. Head and concave design give perfect impact action instead of a partly sliding action between concaves and mantles. Top shell and concaves are reversible, thereby doubling life of those parts. These and other features which merit your fullest consideration of the Kennedy Ball Bearing Gearless Crusher are fully described in Bulletin 44-A.



FOR POSITIVE ACTION ON THE SCREEN CLOTH

Install Kennedy Vibrating Screens. They give positive action without transmitting vibration to supporting members. The type of vibration used permits lower speeds for large pieces and higher speeds for small pieces. Material is continually turned over when passing along the screen surfaces. In this way, exceptionally high efficiency is obtained at all times.

Kennedy Vibrating Screens are made in a wide variety of sizes with single or double decks to meet any screening requirements.

KENNEDY ROTARY KILNS

Shown here is a Kennedy 10' x 9' x 250' rotary kiln mounted on four riding rings. Kennedy Kilns are of all-welded steel construction and are driven through a totally enclosed herringbone gear reducer. All materials are especially selected to suit the work for which they are intended. All wearing parts are carefully machined to ensure true-fit and best operation.



2 PARK AVENUE • NEW YORK 16, N. Y. FACTORY: DANVILLE, PA.



The X71-WD drill, that is used on FM-2 Wagon Mountings, has the power required to turn long drill steels and to provide the slugging blow necessary to maintain high drilling speed in deep holes. The piston is the heaviest used in any hammer drill, and has an extremely long stroke. It hits a heavy blow and its unique follow-through characteristic overcomes the inertia of long, heavy drill steel. Strong rotation results, hence the bit is always taking deep, fresh bites in the rock. The cuttings are easily removed by the drill's unusually effective method of hole cleaning.

The flexibility of the FM-2 Wagon Mounting permits the use of the powerful X71-WD drill in all kinds of ground. Holes can be drilled at any angle—wherever you want them. If you have a tough job of drilling to do, these are the Wagon Drills to use. Your footage per shift will be greater and your costs lower.

POWER FOR DEEP HOLES with I-R Wagon Drills

Ingersoll-Rand

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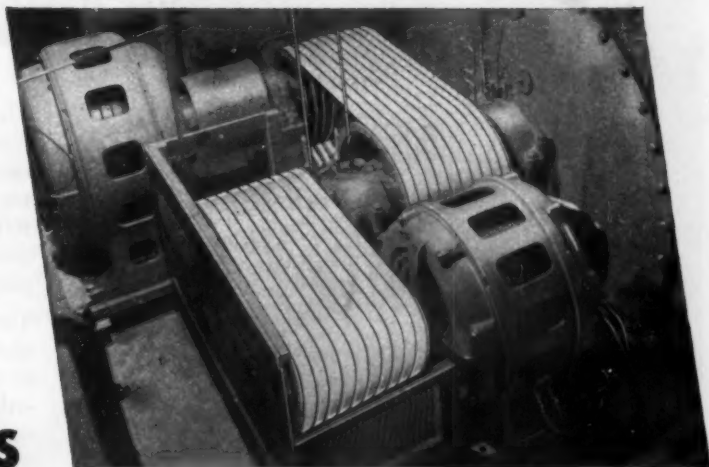
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Today-

Your Standard GATES V-Belts



- Made of Synthetic Rubber -

are out-performing **ANY** V-Belts
ever made of NATURAL Rubber!

No V-Belts built by *anyone* before the war could stand the service now daily delivered by Gates V-Belts on army tanks, tractors and self-propelled big guns. Gates developed these greatly superior V-Belts through intensified, specialized research—and Gates is building these belts entirely of *synthetic rubber*.

This fact is now important to **YOU**
— and here is the reason:

● Every improvement developed by Gates for these Army V-Belts has been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.

In the case of many *other* products, as you know, you must wait until after the war to get the benefits of war-time improvements. But victory depends so directly upon production and production so directly upon V-Belts which drive the producing machines, that Gates has been able to give you *immediately*, in your Standard Gates Vulco Ropes, every V-Belt improvement which Gates specialized research has developed for use in the Army's motorized equipment.

In addition, where V-Belts of special construction are required, your Gates Rubber Engineer is in position to supply a Gates V-Belt that is precisely engineered to meet your special needs.

Whatever drive problem or V-Belt problem you may have, you need only to pick up your phone book and look under the heading "Gates Rubber." The Gate Rubber Engineer will bring right into your plant the full benefits of every advance in V-Belt construction and in drive operation that Gates specialized research has developed.

THE GATES RUBBER COMPANY

Engineering Offices and Jobber Stocks in All Large Industrial Centers

NOTE:
GATES ALSO
MAKES THESE
SPECIAL BELTS
TO MEET
EXCEPTIONAL
SERVICE NEEDS-

Rayon Cord V-Belts
Static-Safety V-Belts
Special Synthetic V-Belts
Cotton Cord V-Belts
Steel Cable V-Belts



The Mark of
Specialized Research

456

GATES VULCO ROPE DRIVES

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CLASSIFYING HYDRATED LIME



The Raymond whizzer type Mechanical Air Separator is specially adapted for classifying hydrated lime, as the revolving whizzer blades tend to break up the soft lumps, thus permitting closer separation of the fines and insuring more positive rejection of the oversize.

The use of the double whizzer with the slide damper control makes it possible to regulate the fineness, so as to produce either the coarser mason's lime or the superfine chemical hydrate, testing 99.5% through 325-mesh.

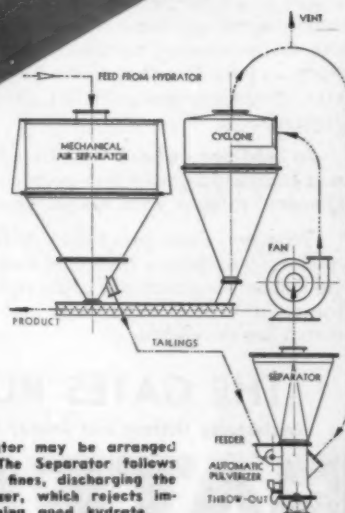
The use of the Mechanical Air Separator in combination with the Automatic Pulverizer, as shown in the diagram below, provides an efficient method of making an extremely fine and uniform finished material at record low cost.

Built in Single Whizzer or Double Whizzer Type, and in sizes from 2' 6" to 18' 0" diameter, for a wide range of applications and capacities. For classifying lime, cement, gypsum, chemicals and manufactured products.



Raymond Laboratory Separator for small scale test work as in handling a few pounds at a time, up to 50 or 100 pound lots to determine the efficiency of separation.

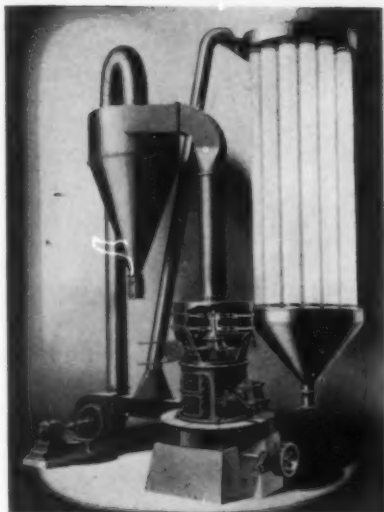
Make finer **LIME PRODUCTS**



Flow Sheet, showing how Separator may be arranged with an Automatic Pulverizer. The Separator follows the hydrator to remove available fines, discharging the tailings to the Throw-out Pulverizer, which rejects impurities and recovers the remaining good hydrate.

RAYMOND PULVERIZER DIVISION
1321 North Branch Street Chicago 22, Illinois

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PULVERIZING LIMESTONE

For heavy-duty grinding . . . requiring big capacities at low cost per ton . . . and long, steady service, use the Raymond High Side Roller Mill. Built with double whizzer separator for wide range fineness control. Throw-out attachment optional, for removing impurities and refining the product.

Highly efficient for grinding burnt lime, dolomite, agstone and limestone fillers

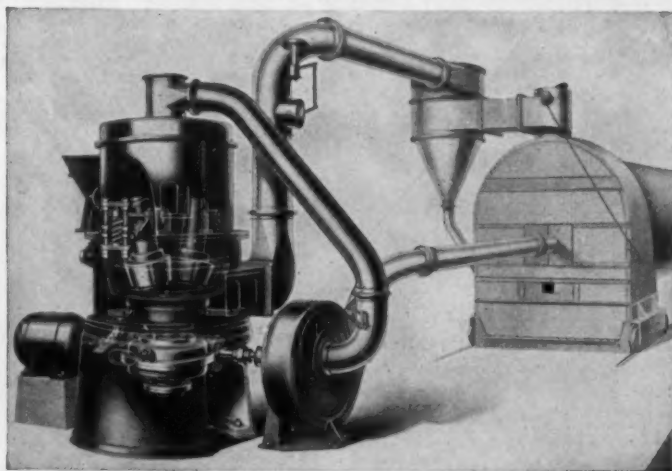
with modern **RAYMOND UNITS**

THE RAYMOND AUTOMATIC PULVERIZER

Equipped with whizzer separator . . . disintegrates and classifies the material . . . rejects hard particles or impurities, and delivers a uniform finished product.



DIRECT-FIRING LIME KILNS



RAYMOND BOWL MILL

The modern firing unit that insures maximum kiln efficiency and minimum maintenance and operating cost. The Bowl Mill handles any grade or moisture coal and "dries in the mill." Maintains uniform grind . . . provides easy control . . . quiet, vibrationless operation. Capable of 24-hour operation, month after month, without shutdowns.

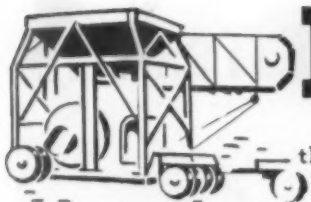
Thermostatic control . . . lubrication and adjustments made outside of mill while in operation . . . high availability . . . wide range capacity.

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LOOK AHEAD with Erie Steel to the post war demand for specification concrete delivered to the job at rock bottom cost ★ We introduced

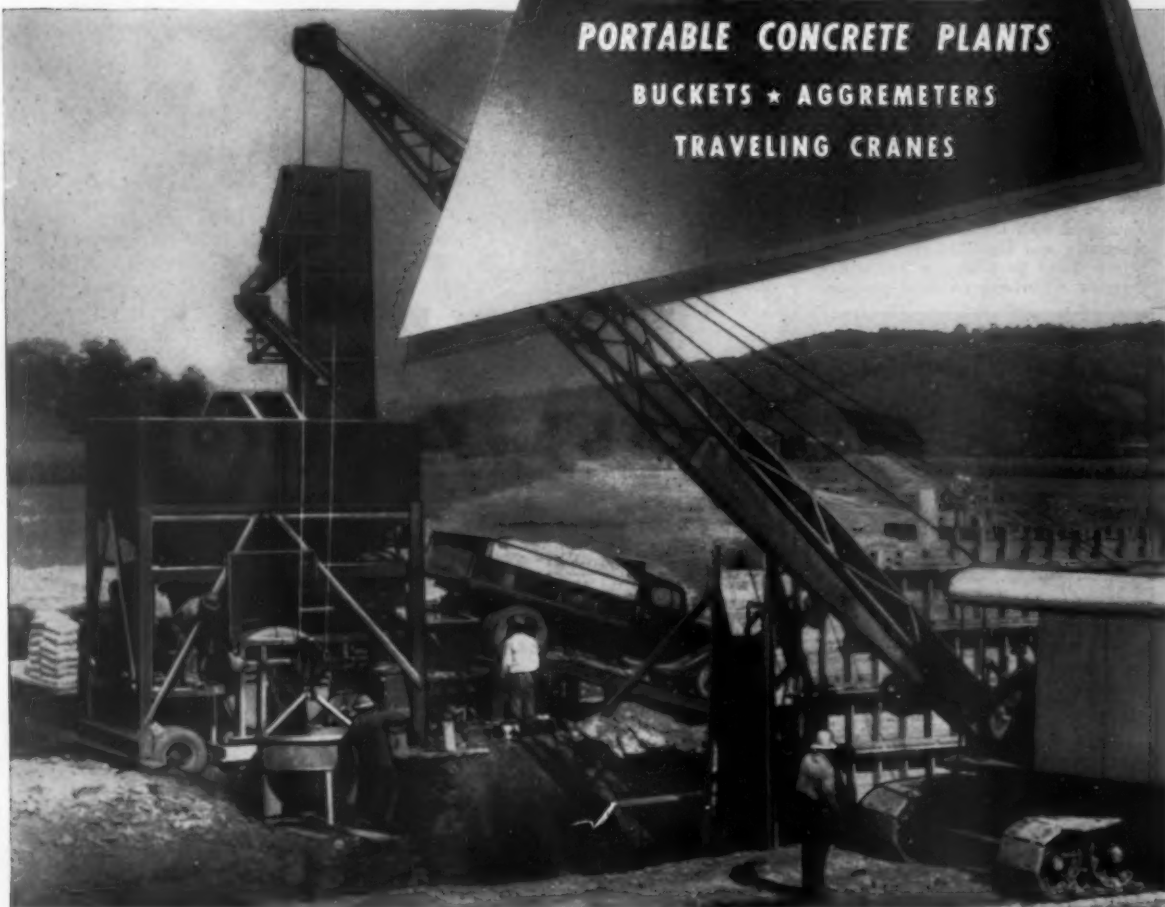
the Strayer Portable Concrete Plant a few years before the war and with the release of materials will be ready with the smoothest operating unit that will provide a fast loading, storage, batching, weighing and mixing concrete unit that will give you up to 40 yards per hour of highest grade concrete at the job ★ General and Road contractors will find it the answer to highway culverts retaining walls, small bridges, buildings, housing and many other concrete uses ★ Plan ahead . . . get the facts on the performance of the Strayer Portable Concrete Plant ★

Write today for the complete details to

ERIE STEEL CONSTRUCTION CO.

756 GEIST ROAD ★ ERIE, PA.

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PORTABLE CONCRETE PLANTS
BUCKETS ★ AGGREGATE METERS
TRAVELING CRANES

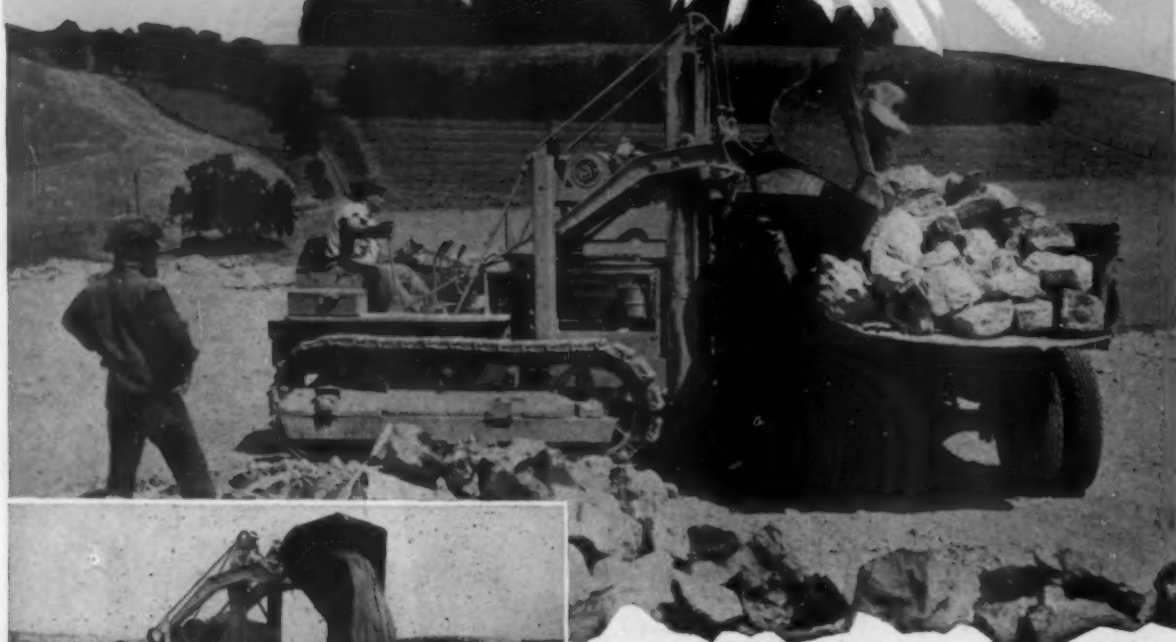


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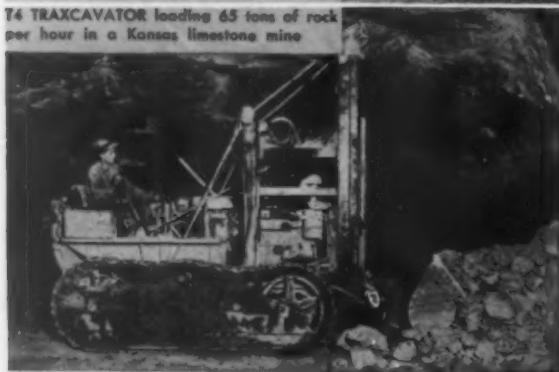
HANDLING COSTS **SMASHED**



TRAXCAVATOR loading rock in a California quarry



Mixing sand, small gravel and pea gravel as truck is loaded at Pueblo, Colorado
T4 TRAXCAVATOR loading 65 tons of rock per hour in a Kansas limestone mine



YOU never saw anything like it! Material handling costs really take a good blasting when you have TRAXCAVATORS on the job. Production jumps to a new high; production costs tumble to new lows. These rugged, compact, powerful tractor excavators dig, load or carry rock, sand, gravel, earth and other materials with speed and profit. But that is not all the story on TRAXCAVATORS' versatility for they also maintain haulage roads, cleanup around the plant and in the pit, do draw-bar work and countless other husky tasks. See your TRACTION-"Caterpillar" dealer for the complete facts, or write direct to TRACKSON COMPANY, Dept. RP-65, Milwaukee 1, Wisconsin.





DIGS



GRADES

TRAXCAVATOR

REG. U. S. PAT. OFF.

THE ORIGINAL TRACTOR EXCAVATOR



LOADS



CARRIES

BARE KNUCKLE CHAMPS DEFEAT WEATHER, DUST AND GRIT



FOR evidence of the punishment "Caterpillar" Diesel Engines can take while dishing out their own wallops day after day, week in and week out, you ought to see this crusher set-up! Out in the open—without hoods—exposed to all kinds of weather—fighting clouds of limestone dust—the two "Caterpillar" Diesel D4600's you see in the picture drive a Gruendler hammermill and conveyor system with but little attention beyond the usual air-filter cleaning and lubrication servicing. (Another "Caterpillar" Diesel, not shown, drives an Iowa jaw crusher.)

Between 500 and 600 yards of lime and rock roll through the plant per 10-hour day.

PROTECTED AT EVERY POINT

"Caterpillar" Diesels are the ideal engines for the grueling work of

rock crushing, quarrying, gravel screening and mining. Besides being rugged and powerful, they are so thoroughly protected with dust seals and air, oil and fuel filters that it is next to impossible for dust, dirt and grit to reach these engines' vital parts.

Their decisive fuel economy is another outstanding feature that will help make "Caterpillar" Diesel Engines your choice, as they have thousands of other enthusiastic owners.

DO YOU NEED A NEW "CATERPILLAR" DIESEL?

Quarry men who have been wishing for one of these famous engines can get in line to have their wishes granted. For many months, the war has taken most of the "Caterpillar" factory's output. If you'd like to be among the early owners of a brand-new "Caterpillar" Diesel, the thing to do is to see your dealer and sign up for one NOW.

Caterpillar Tractor Co., Peoria, Illinois

CATERPILLAR DIESEL

REG. U. S. PAT. OFF.



ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Dunked in dust and without missing a



This G-E diesel-electric locomotive is as ready to
stand as a steam locomotive at the plant of Basic Refractories



**diesel-electric
INDUSTRIAL
LOCOMOTIVES**

WHY IT PAYS TO USE DIESEL-ELECTRICS

Availability—90 per cent up!

The diesel-electric carries sufficient fuel for several days' operation, runs for long intervals between overhauls, and requires only periodic inspections.

Always Ready to Go

The diesel-electric starts on the press of a button. No unproductive time is taken to get the locomotive ready for work.

Fuel Costs Low

The diesel-electric's high efficiency allows it to operate on a fuel cost that is only a fraction of that of a steam locomotive. Moreover, you

don't have to keep the engine running to "keep up steam."

One-man Operation

The diesel-electric needs only a one-man crew, as against two usually required on a steam locomotive.

Maintenance Simplified

The diesel-electric has no boiler, firebox, or heavy reciprocating parts, thus greatly simplifying maintenance.

A High-return Investment

Cost records show that G-E diesel-electrics often return 20 to 30 per cent annually.

25-TON 45-TON 50-TON 65-TON 80-TON



water for four years trip!



This G-E diesel-electric locomotive is operated in an atmosphere often filled with stone dust. Whenever it passes under the tipple, it is showered with water from the freshly washed stone above. There is also a prevailing grade of one per cent, and practically no level trackage anywhere.

Yet even under these tough operating conditions, this locomotive has required no more than normal maintenance, and has had an average availability of 97 per cent.

Since October, 1941, this 45-ton G-E diesel-electric has provided the principal motive power at the Maple Grove, Ohio, plant of Basic Refractories, Inc., averaging 7000 to 7500 hours of work a year.

Nine months of the year, during the agricultural limestone run, it is assigned to 24-hour service. The remaining three months it operates 16 hours a day.

It switches standard cars over some 14 miles of track, handling trains up to 23 cars each. In addition to switching, it hauls raw materials from the quarry, products in process to the kilns, and finished products to the railroad siding.

Whatever the conditions at your plant, one of these locomotives might greatly reduce your switching expense. Why not have a G-E engineer make a survey of your requirements and tell you how economical it would be to operate a G-E switching locomotive?

General Electric Company, Schenectady 5, N. Y.

Buy all the BONDS you can—
and keep all you buy

GENERAL  ELECTRIC



QUAKER

the well-known name in Rubber

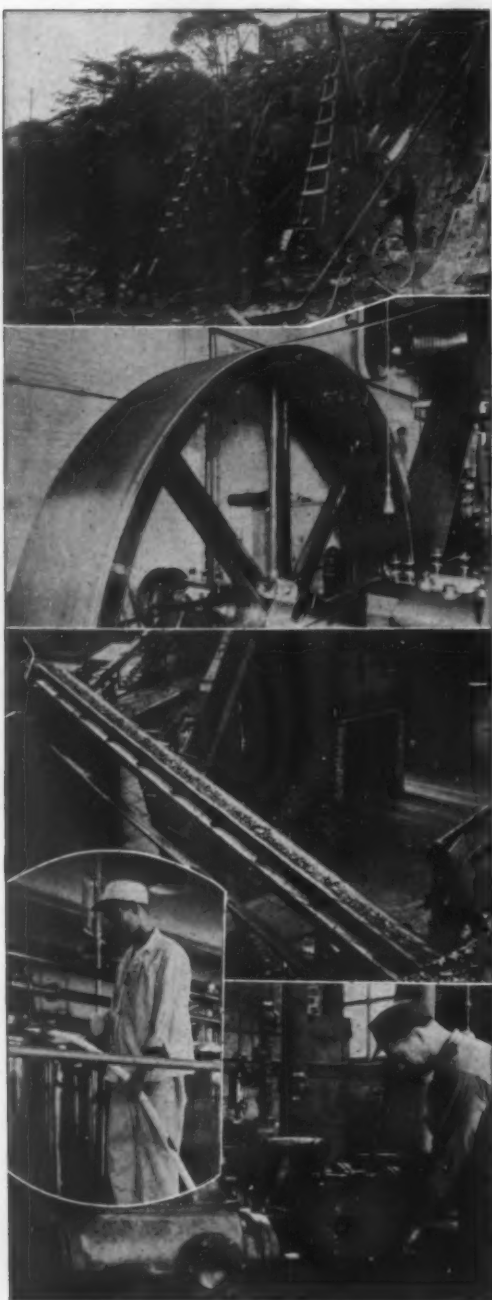
Industrial Rubber Products are going to the many departments of the Government in large volume in the War effort. The brand name of Quaker will be found on many of these products of Belting, Hose and Packings.

Former Quaker employees, now Service men, writing from all parts of the world send us some very interesting letters telling where they see Quaker products in use, and how they are helping in the war effort. Much of Quaker's production is going to such destinations. There is not as much left for civilian users as we would like.

The day cannot come too soon for us so that Quaker can devote all our facilities to the turning out of products for civilian use.

This war has brought us face to face with shortages in many of our accustomed essential products in food, clothing and many of what we formerly considered necessities. Some day there will be enough Industrial Rubber Products to meet all demands.

It is good policy to keep on asking for Quaker—the name that stands for Quality Industrial Rubber Products.



*"If there is a way to get it done
—Quaker will do it"*

QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA. • NEW YORK 7 • CLEVELAND 15 • CHICAGO 16 • HOUSTON 1
Western Territory
QUAKER PACIFIC RUBBER COMPANY • SAN FRANCISCO 5 • LOS ANGELES 21

BIGGER LOADS . . . LOWER COST . . . GREATER PROFIT!

GAR WOOD

Extra-Heavy-Duty

DUMP BODIES

and Hydraulic Hoists



Body with open or scoop end. Hydraulic, Twin Cylinder Telescopic Hoist.



Trucks equipped with Gar Wood X-112 Bodies and T-4440 Hydraulic Hoists haul **BIGGER LOADS** on fast schedules. This speedier handling of overburden, ore and coal means lower operating cost and greater profit for you. Remember too, when

you buy "Gar Wood" you get the benefit of more than a quarter of a century of experience in building Hydraulic Hoists and Dump Bodies . . . a factor that has made this line the most popular in the field and preferred by all types of operators.



Body with automatic downfold tailgate. Gate opens as body elevates.



One-way side dump Body with Dual Hydraulic Hoist. Automatic downfolding side.

Support the 7th War Loan . BUY MORE BONDS

GAR WOOD INDUSTRIES, INC., Detroit 11, Mich.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

WORLD'S LARGEST MANUFACTURERS OF TRUCK AND TRAILER EQUIPMENT

WINCHES AND CRANES • TANKS • ROAD MACHINERY • HEATING EQUIPMENT • MOTOR BOATS

CLEAN



Gardner-Denver S-55

Gardner-Denver S-73

HOLE CLEANING! That's the real test of a sinking drill.

Exceptional hole cleaning ability is a "must" feature of Gardner-Denver Sinkers. In hard or soft ground, they keep the hole clean . . . permit faster footage per shift. Open the blower valve, and a powerful stream of air under full line pressure blasts every bit of material out of the hole . . . fast.

Gardner-Denver Sinkers are easy riding . . . perfectly balanced to assure the easy holding that cuts down operator fatigue. From the 31-pound S-33 to the 80-pound S-79, Gardner-Denver Sinkers help speed job progress.

* * *

For complete information on Gardner-Denver Sinkers,
write for descriptive bulletins.
Gardner-Denver Company, Quincy, Illinois.



GARDNER-DENVER

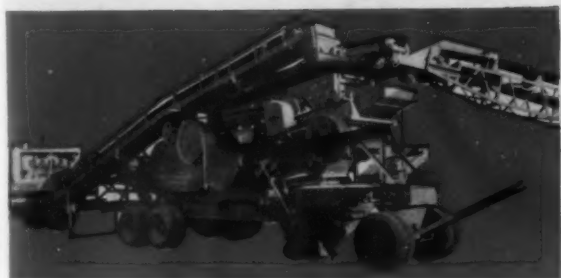
Since 1859



BOTTOM DECK FEED

EXCLUSIVE PIONEER FEATURE

Doubles effective screen area-



YOU GET THESE ADVANTAGES:

- 1 Balance the work of the two crushers without changing screens.
- 2 Produce "stone chips" in the main screen without extra screen equipment.
- 3 Control the gradation of the output to meet specifications.
- 4 Reject sand and control the percentage of sand rejected.

Duplex screening is Pioneer's radical innovation to handle the extra gradation to be done where two crushers are used in a gravel or quarry plant.

Pioneer makes one vibrator screen do the work of two. Pit material is screened on the bottom deck and the crushed material on the top deck. Both decks produce specification or pay material and "chips" can be separated. The screen shown is a 4' x 12' unit whose two decks have a combined total working area of 96 sq. ft.

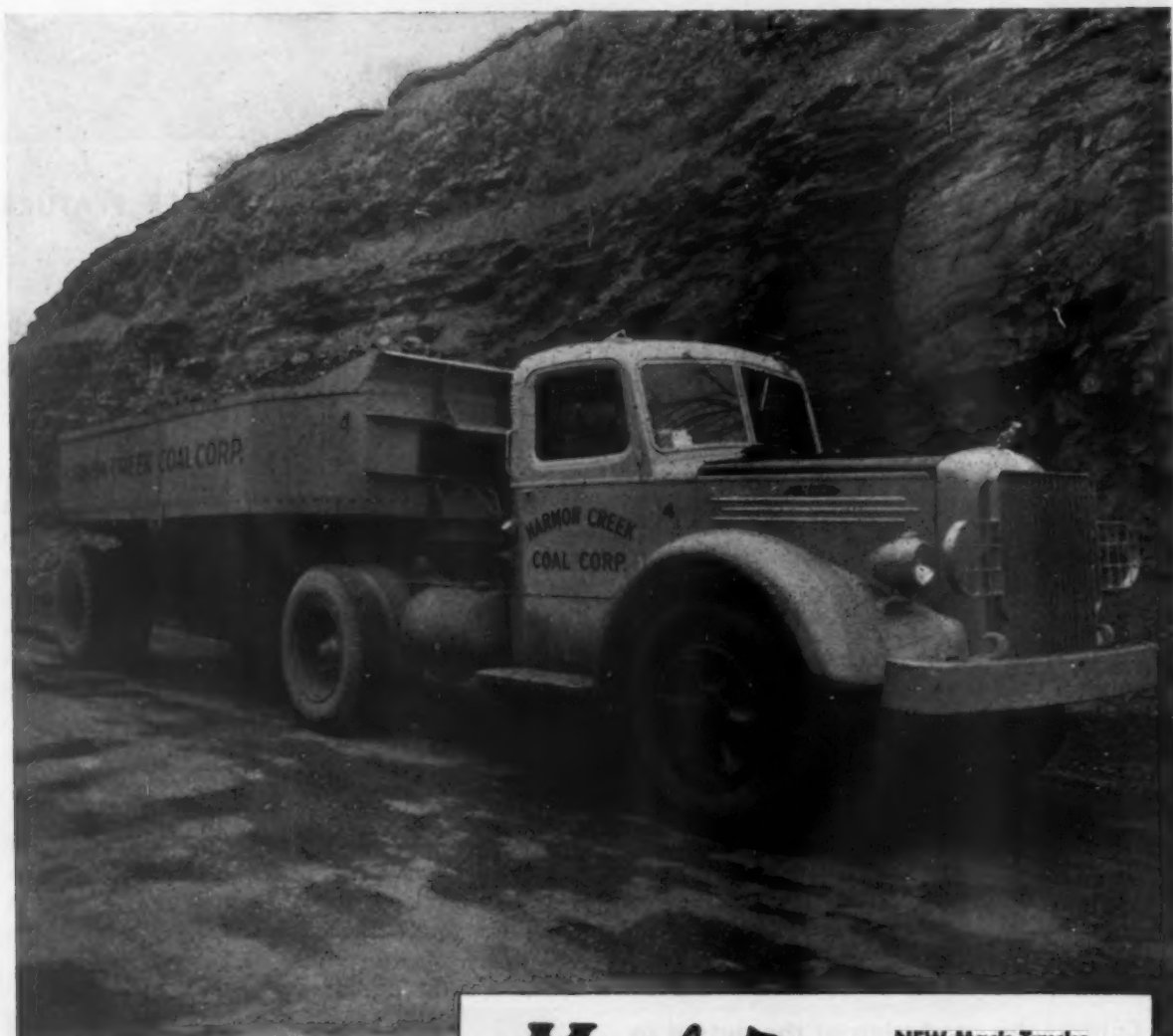
Only with this exclusive Pioneer bottom deck feed can you get all these advantages. Write or talk to Pioneer Plant users, or to Pioneer engineers and distributors for further information on how to handle large crushing capacity with a single screening unit.



16 tons...40 mph...2000 tons per day!

WHEREVER YOU find a job of tough, heavy hauling going along fast and easy, you'll usually find a Mack. The reason? Simple. Mack trucks are built to be the *best* in the world. Performances *prove* the success of that aim!

The Harmon Creek Coal Corporation operates a fleet of seven Macks in the Pittsburgh coal area. These trucks average 2,000 tons a day on a 7-hour day basis. Where mine road conditions permit, these rugged Macks haul their 16-ton payloads at 40 miles an hour! An amazing performance, yes, but day after day routine for Mack. Because you've got *more* truck, you get *more* work from a Mack!



★ BUY THAT EXTRA WAR BOND TODAY ★



Mack Trucks, Inc., Empire State Building, New York, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Factory branches and dealers in all principal cities for service and parts.

Mack
TRUCKS

FOR EVERY PURPOSE

ONE TON TO FORTY-FIVE TONS



NEW Mack Trucks
are available for
essential civilian use.
Ask for details.



3 CU. YD.

In comparison with Jaeger's "SPEED MERCHANT"
ANY OTHER TRUCK MIXER IS 5 YEARS OLD



2 CU. YD.

THESE FEATURES ARE OBSOLETE TODAY

- Movable Hoppers and Hopper Seal Troubles
- Top-Heavy Overhead Water Tanks
- External Drum Gears and Power Drive Alignment Problems
- Vital Parts Exposed to Dirt and Weather
- Inaccessible Internal Reversing Clutches
- Awkward Chute Hangers
- High Center of Gravity, Etc., Etc.

"HI-DUMP" OR "LOW CHARGE": The improvements shown in these HI-DUMP models are also available in "LOW CHARGE" types up to 5½ cu. yd. sizes.

4½ CU. YD.



If you want the public to know that you intend to maintain up-to-date "ready-mixed" service in your community, the quickest way to tell them is to put

one of these 1945-model Jaegers on the street. In appearance, in construction and in speed and efficiency of operation, they make previous truck mixer designs completely out-of-date. Talk to your Jaeger distributor or write us for new Catalog TM-5.

THE JAEGER MACHINE COMPANY

Main Office and Factory, Columbus, Ohio

REGIONAL OFFICES:	8 E. 49th St. NEW YORK 17, N. Y.	226 N. LaSalle St. CHICAGO 1, ILL.	235-38 Martin Bldg. BIRMINGHAM 1, ALA.
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Throwing Rocks at the Japs



As fast as the Japs are pushed back from South Pacific Islands, air bases are established. Knowing there would be need for a single, highly mobile rock crushing plant, Universal engineers — early in the war — designed such a plant. Scores of them are in use from Australia to almost the gates of Tokyo.

Designated our No. 522-Q, these plants consist of a 20" x 36" Series "SL" primary jaw crusher mounted on a steel-wheeled truck with power unit and conveyor. Crushed material from the primary is fed to a grizzly with bypass placed over the truck-mounted 30" x 18"

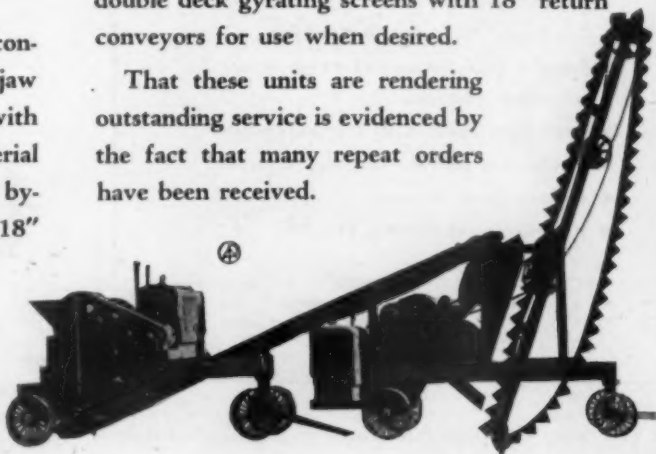
secondary roll crusher, oversize chuting to the roll crusher and throughs going to a bucket elevator boot. Elevator discharges into bin made of native materials to load trucks for hauling to landing strips under construction.

All the plants are provided with 3' x 8' double deck gyrating screens with 18" return conveyors for use when desired.

That these units are rendering outstanding service is evidenced by the fact that many repeat orders have been received.

UNIVERSAL ENGINEERING CORPORATION

617 C Ave. West, Cedar Rapids, Iowa



UNIVERSAL

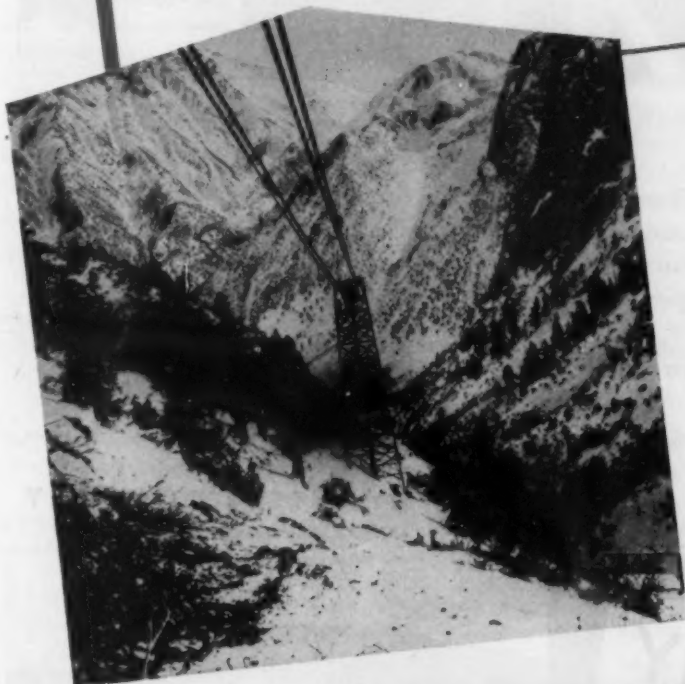
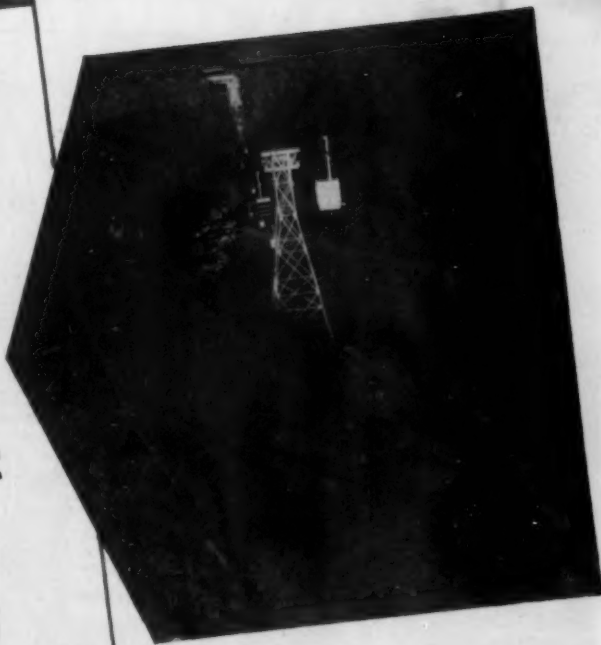
ROCK AND GRAVEL CRUSHERS, CRUSHING ROLLS, HAMMER MILLS, COMPLETE CRUSHING AND SCREENING PLANTS, WASHING PLANTS, ASPHALT PLANTS, SPREADERROLLERS.

**This all-weather route
makes operations
profitable 12 months
of the year!**

(Right)—175 tons of coal per hour are carried over this U-S-S American Aerial Tramway which is operated by the Electro Metallurgical Company, Alloy, W. Va.

(Below)—100 tons of tungsten ore per hour go down to the mill of U. S. Vanadium Corporation in the High Sierra Mountains of California.

**Neither topography
nor temperature
affects aerial tramway
transportation**



THE modern aerial tramway is often the *cheapest* distance from mine to mill or railroad.

Regardless of weather and climatic conditions, rivers, ravines and mountainous cliffs offer no insurmountable obstacle to the aerial tramway. Whether the distance is a few hundred feet or several miles, you can quickly, safely, and economically move up to 300 tons per hour.

The more difficult the ground conditions, the heavier the load, the greater your ultimate ton-mile savings.

As one of the foremost designers, manufacturers and erectors of aerial wire rope tramways, American Steel & Wire Company welcomes an opportunity to help you solve your "mine to mill or railroad" transportation problems. An inquiry on your letterhead will bring interesting facts.

American Steel & Wire Company

Cleveland, Chicago, and New York

Columbia Steel Company

San Francisco

United States Steel Export Company, New York

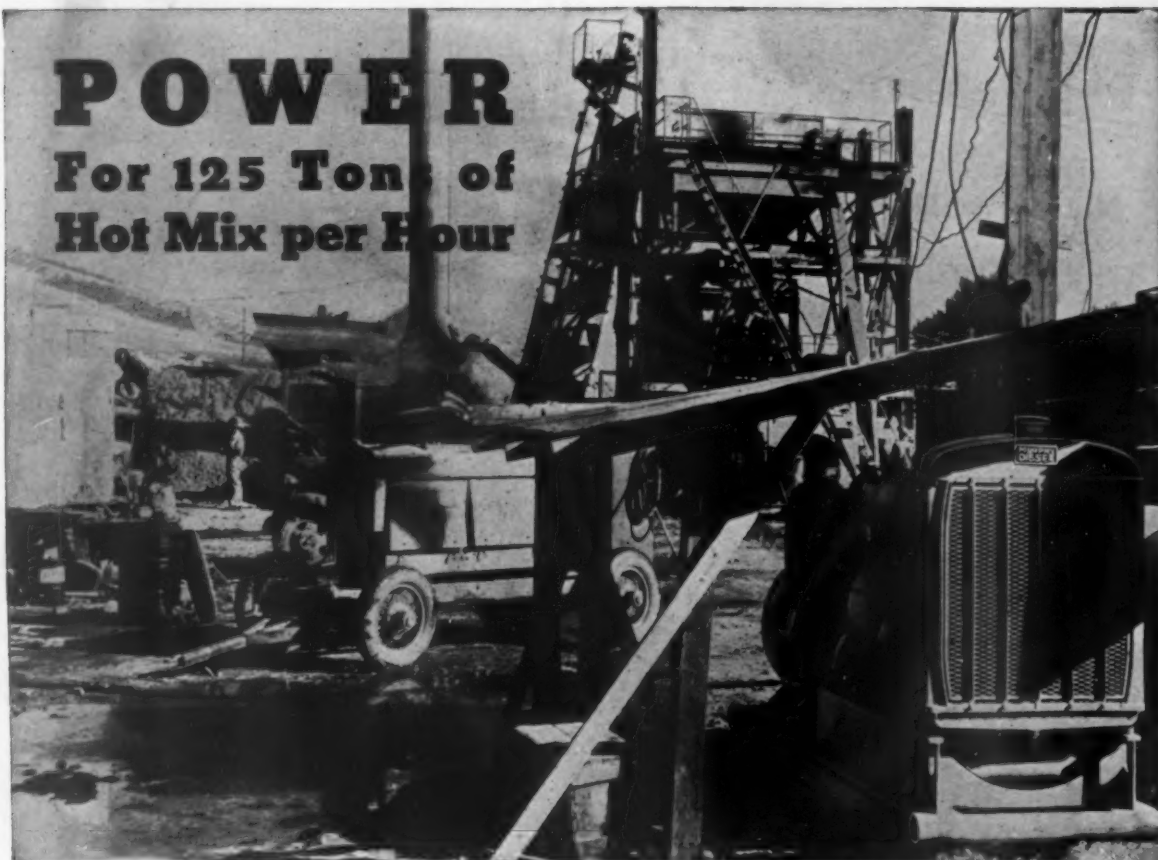
UNITED STATES STEEL

U-S-S American Aerial Tramways



POWER

For 125 Tons of
Hot Mix per Hour



Model ME-650 Murphy Diesel Generating Set—240 Volt, 3-phase, 60-cycle, 106 KW continuous capacity, powering a "Cedar Rapids" Hot Asphalt Plant for R. P. Herrick at Frenchtown, Montana.

MURPHY DIESEL Engines and Generating Sets have won their well-earned reputation for "More Power, More Profit" by their ready adaptability to the many power requirements of the construction industry.

This R. P. Herrick asphalt plant on the big Frenchtown, Mont. asphalt job...requiring 18,000 tons of material...is typical of Murphy

Diesel performance which permitted an average of 125 tons of hot mix per hour...considerably better than the record before installing the Murphy Diesel Generating Set.

Soundly engineered for heavy-duty work, Murphy Diesels have the ruggedness it takes to stay on the job...and the power, dependability and economy to do the job profitably. Write for bulletin.



★ Buy U. S. War Bonds ★

More Power

**MURPHY
DIESEL**
Reg. U.S. Pat. Off.

More Profit

MURPHY DIESEL COMPANY

5315 West Burnham Street
Milwaukee 14, Wis., U.S.A.

*Engines: FROM 90 to 215 HP
Generators: FROM 60 to 115 KW*

"FIELD-PROVEN Power"

101

How **TOURNAPULLS** Fit QUARRY, SAND and GRAVEL PROBLEMS



with Super C Tournapull

Capacity:	
Struck	12.1 cubic yards
Heaped	15 cubic yards
Speed (high)	14.9 mph
Power	150 HP Diesel
Wheelbase	22 feet 0 inches
Width of cut	8½ feet
Tire size	21.00x24
Weight	31,000 pounds
Weight per horsepower	207 pounds
Tractive weight (Loaded; on power wheels)	30,300 pounds
Interchangeable units: Tournacrane, rear-dump Tournatrailer and flat-bed Tournatruck	
Output per 60-minute hour in common, 1000-foot one-way haul, snatch loading, 156 pay yards per Super C.	



with Model D Tournapull

Capacity:	
Struck	2 cubic yards
Heaped	2.3 cubic yards
Speed (high)	16.1 mph
Power	44 HP Gasoline
Wheelbase	12 feet 8 inches
Width of cut	4 feet
Tire size	14.00x24 and 7.50x16
Weight	6,339 pounds
Weight per horsepower	144 pounds
Tractive weight (Loaded; on power wheels)	5,960 pounds
Attachments: Tiltadozer, Rooter tooth	
Interchangeable units: Tournalift and Tournatruck	
Output per 60-minute hour in common, 1000-foot one-way haul, pusher loading, 29.5 pay yards per D Tournapull.	

Tournapulls are the revolutionary high-speed scraper units that move dirt at lower costs than ever before. They are self-loading and self-spreading haul units. Their rubber-tired power saves time and money on stripping; excavating and hauling loose material to plant; load and haul, pit-run or stock-piled gravel or crushed stone.

The 15-yard Super C fits big volume plants . . . moves materials at costs lower than crawling scrapers or shovel-truck combinations. Quickly snatch-loaded by your dozer-tractor, ideal for shallow or deep cuts, loads any material a Rooter can break loose. Tournapull prime mover is interchangeable on Scraper for dirtmoving and 17-yard rear-dump Tournatrailer for hauling rock.

The smaller 2.3 yard Model D is ideal for stripping and working small sand and gravel pits, pit and plant road maintenance, for mining roadside pits and delivering material from pit or portable-plant stockpiles. Two Model D's can push-load each other, need only two operators and two units to make a complete working team. Dozer on front can be used for pioneering and light clearing.

You will want Tournapulls in your postwar setup because they cost less to buy, operate and maintain than equal output capacity in any other type of earthmoving equipment. For more information see your LeTourneau distributor or write TODAY to Dept. RP645, R. G. LeTourneau, Inc., Peoria 3, Ill.

PQ3

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

facturers of Tournapulls*, Angledozer*, Bulldozers, Tiltadozers*,
Scrapers, Power Control Units, Rooters*, Tournatrailers*,
Cranes*, Tournatrucks*, Sheep's Foot Rollers, Tournarope*,



TOURNAPULLS

RUBBER-TIRED POWER FOR FASTER EARTHMOVING

BIG *all the way through*

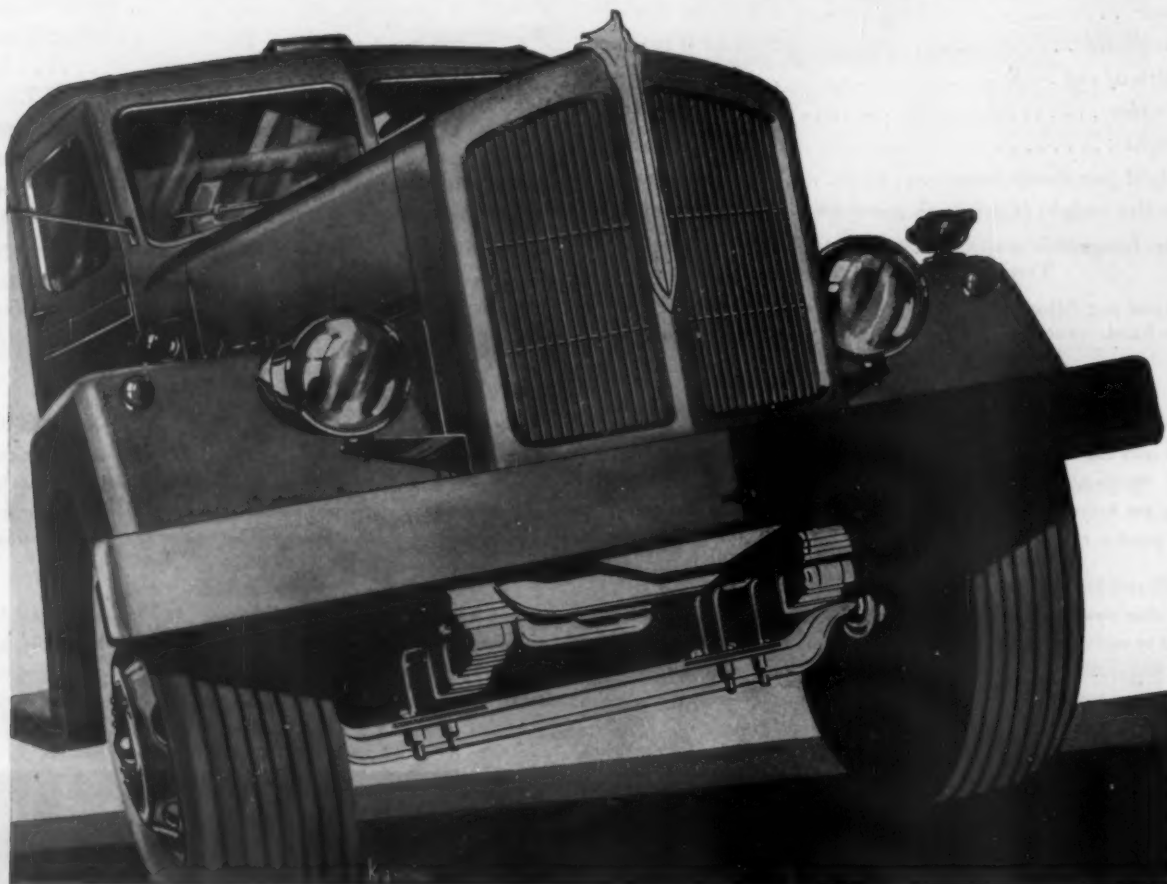
When you see the new Ward LaFrance commercial models, you'll be looking at something new in transportation . . . the toughest, sturdiest job on the highway. It's the "civilian" version of the great M1A1 Heavy Wrecker we have been turning out in volume for the Army, developed to be the last word in rugged truck performance . . . The new Ward LaFrance heavy-duty trucks are "built big" not only in rated capacity, but all the way through.

. . . If your fleet suffers from the usual profit-eating toll of axle failures, broken springs, burned clutches, the new Ward LaFrance is the common-sense answer to more dependable, lower-cost hauling. This stamina comes from a basic engineering principle of providing strength, more than sufficient for your requirements. Ward LaFrance has evolved a sales plan of unusual interest, which you should investigate. Write to our Sales Department today for details.



WARD LAFRANCE TRUCK DIVISION

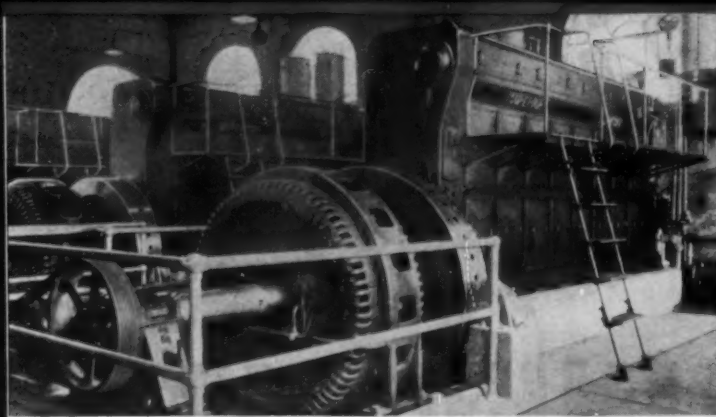
GREAT AMERICAN INDUSTRIES, INC., ELMIRA, NEW YORK



There are Values in

Superior
DIESELS

.... that only
performance can reveal



Municipal Light & Power Plant, Paragould, Arkansas

SUPERIOR DIESELS • STATIONARY, 28 to 1325 H.P.
MARINE, 28 to 1325 H.P. • GENERATOR SETS, 20 to 930 kw.

• *Superior* **ENGINES**
Division of
THE NATIONAL SUPPLY CO.
Plant and General Sales Office: Springfield, Ohio

We Call Our **LINK-BELT SPEEDER** "The Machine that's Never Down!"

On the go 20 hours per day for over two years, this LS Eighty-five has won unstinted praise from its operator. Not only has it maintained a higher average loading, but it has been in tip-top shape without a moment's time out for repairs or maintenance.

Performance of this kind wins friends,—and makes money for contractors the country over.

GET A
**BIG
BITE**
with a
**LINK-BELT
SPEEDER**

For Prompt, Efficient, Convenient Sales and Service There
Is a Link-Belt Speeder Distributor Located Near You

LINK-BELT SPEEDER



Builders of the Most Complete Line of
SHOVELS-CRANES-DAGLINES



LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.

(A DIVISION OF LINK-BELT COMPANY)



Rising Star

The habit of constantly TRYING leads to the habit of SUCCEEDING, as every parent—and every businessman—knows. It is this “habit of trying” . . . and succeeding . . . on the part of Hewitt’s rubber engineers that has led to so many advancements in rubber for industry . . . that led to Hewitt’s successful development of SYNTHETIC compounds 14 years ago . . . at a time when they were just a “gleam in the eye” of most manufacturers now producing them.

This priceless “plus” of constantly trying . . . of usually succeeding . . . means industrial rubber products designed to DO your job BETTER . . . do it LONGER . . . COST LESS per working hour.

★ ★ ★

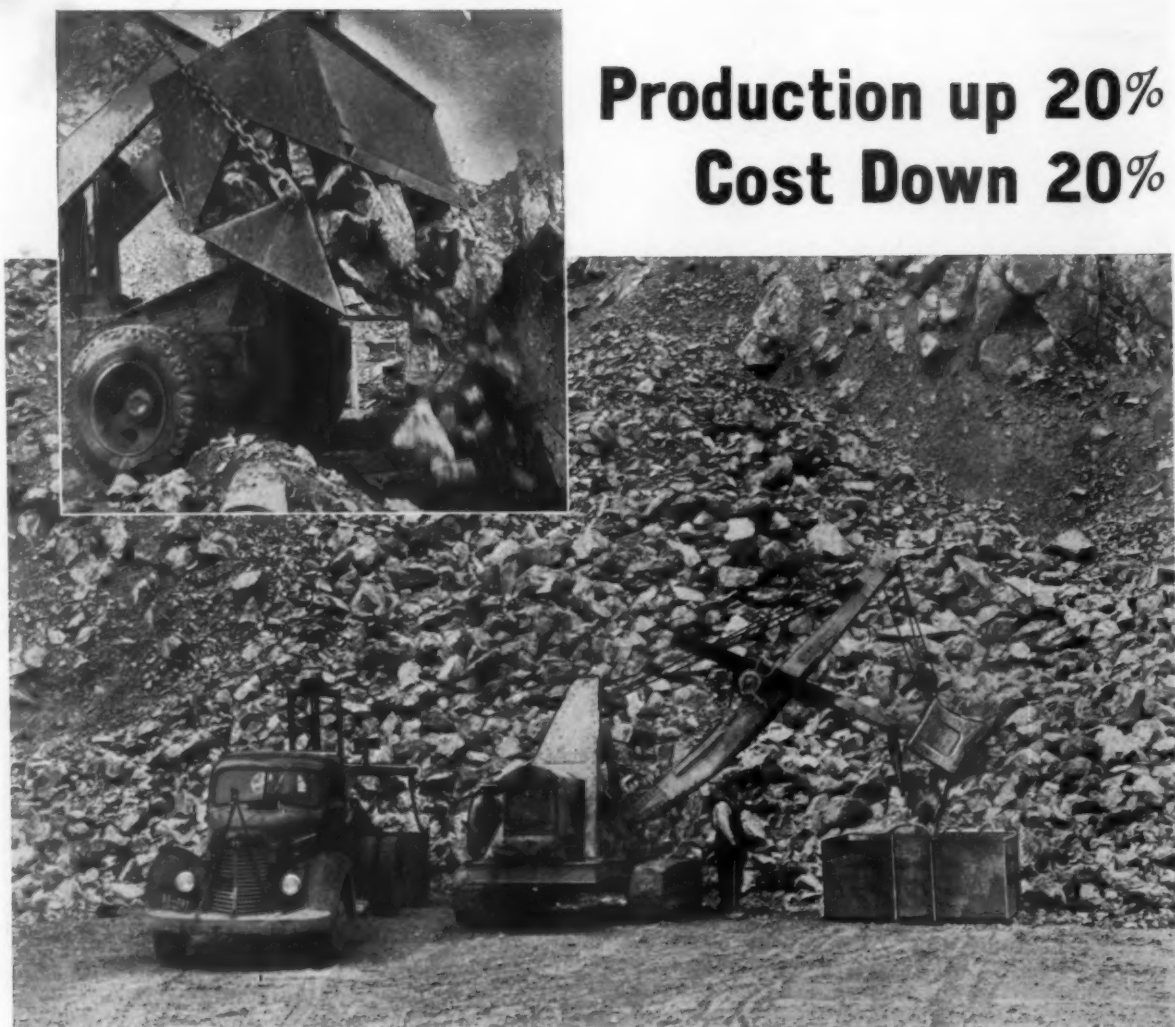
Specify “Hewitt” for quality industrial rubber products. Phone the Hewitt distributor listed in the Classified Section of your telephone directory . . . or write Hewitt Rubber Corporation, 240 Kensington Avenue, Buffalo 5, New York.



HEWITT RUBBER *of Buffalo*
Job-Engineered Industrial Hose • Belts • Molded Goods

QUALITY RUBBER PRODUCTS FOR INDUSTRY FOR 85 YEARS

Production up 20% Cost Down 20%



★ Here is a typical example of what takes place when a quarry changes over to the Dempster-Dumpster system of hauling material.

In the operation illustrated above—a large western limestone quarry—the method of hauling was changed from track and cars to a Dempster-Dumpster Unit and a number of detachable bodies. Although bodies are loaded by mechanical shovel, production has been increased 20% and costs of production reduced 20%. Where hand loading is the method used in loading the detachable bodies, production and savings are usually greater.

No amount of words can explain how simply and easily the Dempster-Dumpster can make such savings possible. But to

see it in operation is all that is necessary to convince you that once put in operation, increased production and great reduction in cost are sure.

When one Dempster-Dumpster and a number of bodies can do the work of 3 to 5 conventional trucks, big savings in gas, tires, trucks and manpower are sure. Write for complete information. Dempster Brothers, Inc., 15 Springdale, Knoxville, Tenn., U.S.A.



WHEN *"Bag"* MEETS *Bag!*



A *"Bag"* of Jap Prisoners
in the Mariana Islands
*tackles a load of American
cement packed in*



MULTIWALLS

Raising Profits from Rock Products...

ROCK DUSTS AND SAND are highly abrasive . . . and shorten rope life when they get into fast-running sheave grooves. To resist this abrasion . . . withstand the heavy stresses of rock products . . . deliver reliable service at lower replacement cost—that's a job for Roebling "Blue Center" Wire Rope!

After all, the basis of good wire rope is the steel in the wires. Roebling "Blue Center" Steel — the finest wire rope steel produced — is custom-made in our small open-hearth furnaces, where quality is closely controlled. Add 104 years of experience in rope-making . . . unsurpassed facilities for research—testing—manufacturing . . . and *you* get the utmost in wire rope value.

Roebling engineers are at your service . . . to help you select the rope most suitable for your particular need . . . and get maximum service from it. Call or write our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON 2, NEW JERSEY

Branches and Warehouses in Principal Cities

**IT'S A JOB FOR
ROEBLING
WIRE ROPE!**



WIRE ROPE AND STRAND • FITTINGS • SLINGS
AERIAL WIRE ROPE SYSTEMS • SUSPENSION BRIDGES
AND CABLES • COLD ROLLED STRIP • HIGH AND LOW
CARBON ACID AND BASIC OPEN HEARTH STEELS • ROUND AND
SHAPED WIRE • ELECTRICAL WIRES AND CABLES • WIRE CLOTH
AND NETTING • AIRCORD, SWAGED TERMINALS AND ASSEMBLIES



ROEBLING

PACEMAKER IN WIRE PRODUCTS



REMEMBER THE DAYS WHEN YOU CHOSE UP SIDES . . . AND HOW IMPORTANT IT WAS TO GET IN "FIRST LICKS"?

This typical American trait of getting there first . . . of staying a jump ahead of the other fellow . . . will be mighty important now that V-E Day permits many peacetime operations to be resumed.

The construction industry will lead the way and those firms, ready *first* to undertake the important work that lies ahead—and well equipped with the necessary machinery to do the job—will enjoy a hard-to-overcome advantage over less progressive competitors.

C.I.T. is sponsoring a brand-new financing plan for the purchase of construction equipment—

different in terms, lower in cost and simpler in operation—that makes it easy for dealers and contractors alike to meet the demand for much needed machinery without depleting working capital.

Any sound enterprise, large or small, can arrange with C.I.T. for this financial backing, promptly and without lengthy negotiations. The cost of equipment purchases can be amortized over many months; there's no interference with business and working funds are left free for operating use.

This is the time for industry to get in "first licks." If additional capital will help you get off to a flying start, inquire about this newly developed finance plan. Write, wire or phone our nearest office for information without obligation.



C.I.T. CORPORATION

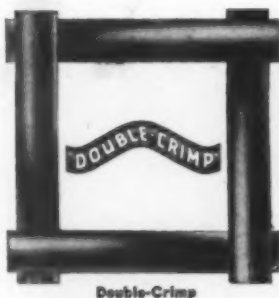
ONE PARK AVENUE, NEW YORK 16, N. Y.

333 N. Michigan Avenue
CHICAGO, ILL.

660 Market Street
SAN FRANCISCO, CAL.

In Canada: CANADIAN ACCEPTANCE CORPORATION Limited, Toronto

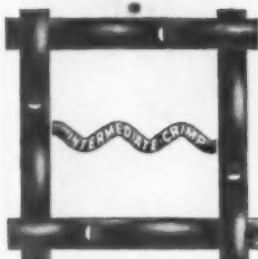
AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED



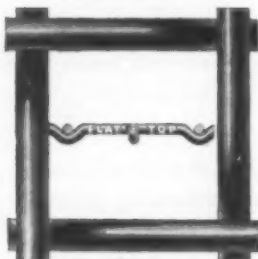
Double-Crimp



Arch-Crimp



Intermediate-Crimp



Flat-Top

"The Perfect"

Wire Cloths and Screens

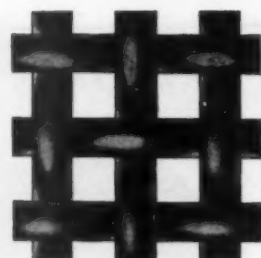
We have been specialists for many years in the making of precision wire cloths, wire screens and woven wire products.

We apply our same precision principles in fabricating wire cloths into finished industrial units, for production or processing equipments or for permanent parts of countless industrial products.

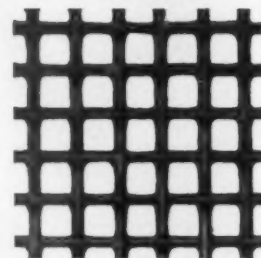
We invite your inquiries for wire cloths of all commercial metals or alloys or weaves, in continuous lengths or cut to size, or processed to meet your individual requirements.

"Perfect" alloys and metals	"Perfect" Wire Cloth weaves	"Perfect" Wire Cloth processing	"Perfect" Wire Cloth products
Super-Loy	Arch-Crimp	Bending	Baskets
Steel	Coiled	Binding	Circles
Galvanized	Double-Crimp	Brazing	Cones
Tinned	Double-Fill	Calendering	Crates
Stainless Steel	Dutch	Clinching	Cylinders
Nickel-Chromium Alloys	Filter	Cutting	Discs
Aluminum	Fiat-Top	Dipping	Forms
Brass	Herringbone-Twill	Dishing	Leaves
Bronze	Intermediate-Crimp	Flanging	Lengths
Commercial Phosphor	Rek-Tang	Flattening	Panels
Copper	Selva-Edge	Forming	Pieces
Monel Metal	Straight-Warp	Framing	Racks
Nickel	Stranded	Galvanizing	Ribbons
Any special alloys available in rod or wire form	Sta-Tru	Painting	Rolls
	Triple-Warp	Shearing	Sections
	Twilled	Slitting	Segments
	Twisted-Fill	Trimming	Spacers
	Twisted-Warp	Arc-Welding	Strips
		Gas-Welding	Template shapes
		Spot-Welding	Trays

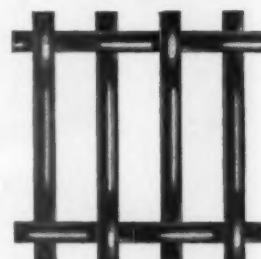
We will follow your specifications and blue-prints exactly as your production engineers have prepared them—or we will submit suggestions for your approval.



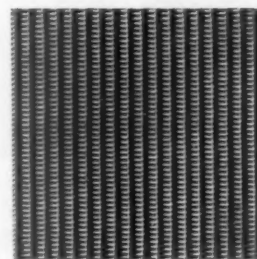
Double-Crimp



Galvanized



Rek-Tang



Dutch Weave

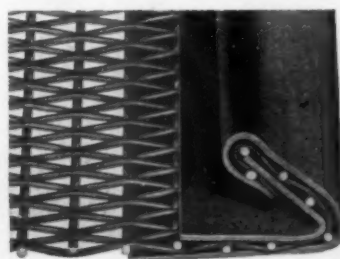
The LUDLOW-SAYLOR WIRE COMPANY

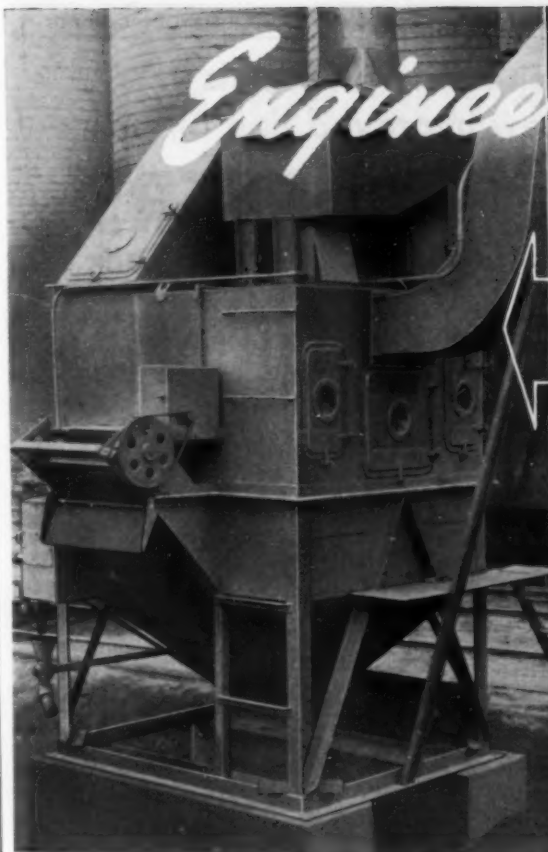
Newstead Avenue & Wabash Railroad
ST. LOUIS 10, MO.



LUDLOW-SAYLOR PRECISION FABRICATING makes vibrating-screen decks and jackets that are easily handled—quickly installed—need fewer adjustments and renewals.

Illustrations suggest only a few of the many available types of wire cloth and woven wire screens, which may be custom-finished with attachments to fit your particular processing installations.





Engineered TO ROCK PRODUCTS DUST CONTROL REQUIREMENTS

TYPE N ROTO-CLONE INSTALLATION AT THE FUNKHOUSER COMPANY

This Roto-Clone exhausts 7000 cfm from a drier removing a heavy concentration of fine slate dust. This dust load with the combustion gases from the drier is handled with constant exhaust volume and high dust removing efficiency assuring cleanliness and an improved product. The Funkhouser Company is a prominent supplier of colored slate surfacing materials for roofings.

The need for adequate dust control in the war effort has resulted in the development by AAF engineers of several entirely new types of dust control equipment, among which the Type N Roto-Clone is outstanding. Originally designed for the handling of hazardous magnesium dust in aircraft engine plants, this new wet dust collector has turned out to be unusually valuable to the rock products industry for the collection of certain types of rock dusts. After being collected and wetted, the collected dust is disposed of in the form of sludge. In addition to the Type N Roto-Clone, the Type W, also a wet type precipitator and the Type D, dry type precipitator are in wide use throughout the industry. In fact, there is a Roto-Clone design available to meet every requirement of the rock products field. Write for descriptive bulletins.

AMERICAN AIR FILTER COMPANY, Inc.

Incorporated

107 Central Avenue

Louisville, Ky.

In Canada: Darling Bros., Ltd., Montreal, P. Q.

ROTO-CLONE

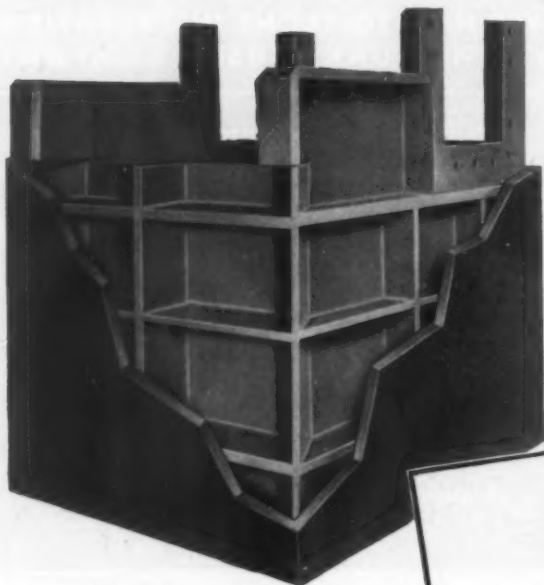
FOR ROCK PRODUCT DUST CONTROL

This announcement is the first of a Series presenting new improved Gruendler Equipment.

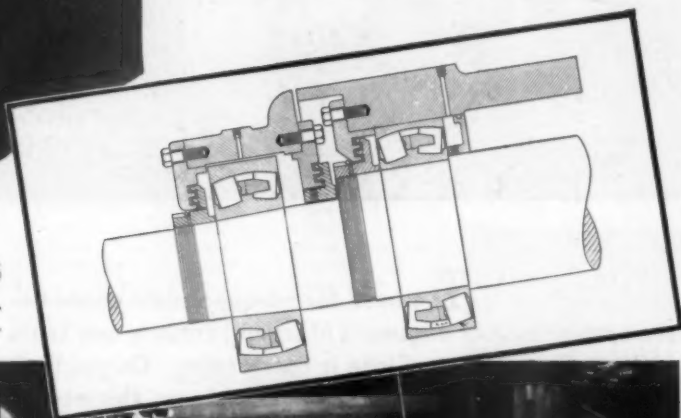
The most advanced engineering principals
are incorporated in the new improved line of

GRUENDLER JAW CRUSHERS

LIGHTER IN WEIGHT • STRONGER "RIGHT" FOR THE TOUGHEST ROCK

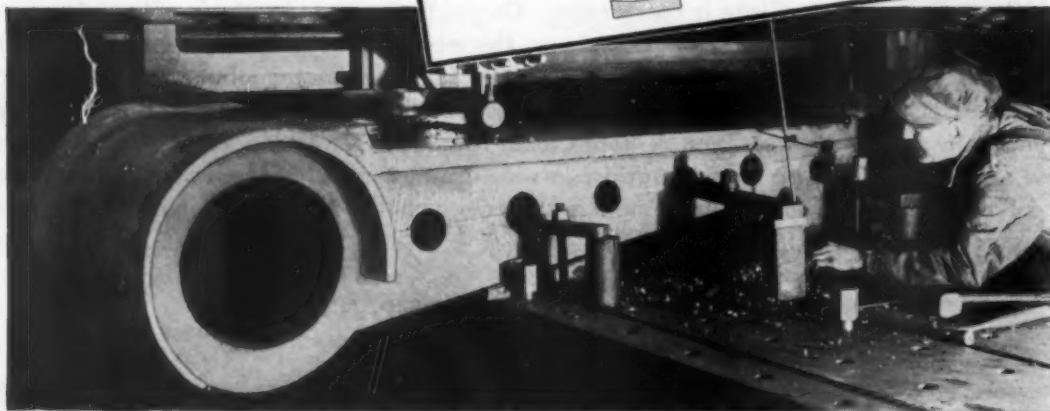


- ▶ 1. Fabricated Steel Plate Frame with multiform ribbing for maximum strength.
- ▶ 2. Precision Machined High Tensile Steel Alloy Eccentric Shaft, Locomotive Type Roller Bearings with dust tight seals.
- ▶ 3. Box Pitman with Internal Cross Ribs of High Tensile Cast Steel.



We Sincerely Believe
Our NEW JAW CRUSHERS

Are the finest crushers we have ever made . . .
And we've been making them for over 40 years.



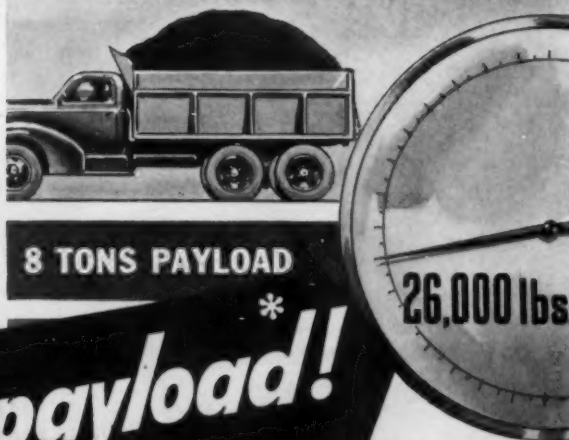
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CRUSHER & PULVERIZER CO. • ST. LOUIS 6, MO.

Same Driver... Same Truck....



4 TONS PAYLOAD



8 TONS PAYLOAD

100% more payload!

QUICK FACTS!

Carries 100% more payload.

Out-pulls, outlasts, out-maneuvers standard trucks costing double or more.

Two-speed gear case increases tractive effort or rim-pull more than 100% over standard truck.

Owners report saving up to 40% on investment... 30% on operating costs... 35% on upkeep expense.

Provides better flexibility and load flotation.

Six wheel brakes assure greater driving safety.

Saves on tires... gasoline... oil... wages and time.

The heart of the THORNTON DRIVE is the exclusive THORNTON Automatic-Locking DIFFERENTIAL which gives both axles POSITIVE DRIVE and DIFFERENTIAL

ACTION without "axle fight." Available as replacement in many standard trucks. Write for details.



A THORNTON Four-Rear-Wheel DRIVE installed on your present 1½-2 ton truck will increase its hauling ability 100%... give it 8 ton payload capacity in contrast to its normal 4. With a Thornton conversion, one driver can handle the payloads of two medium trucks. Special axles permit still bigger payloads. You, therefore, double your trucking volume without necessity for hiring another driver or buying another truck.

And that's not all a THORNTON Four-Rear-Wheel DRIVE does for you. Its two-speed gear case and two driving axles, working in combination with the standard truck transmission, enables you to pull 26,000 pounds G.V.W. up grades as steep as 50%. Its 8 to 16 speeds forward, depending upon the axle type, give you power for every operating condition—let you haul 8 tons payload through mud, muck, deep sand or snow, out of steeply inclined gravel pits or quarries—every place, in fact, where the conventional single axle truck would be hopelessly stalled. And with all this power, a THORNTON Four-Rear-Wheel DRIVE lets you roll on the highway at 40-50 miles per hour, to maintain important delivery schedules.

The THORNTON Four-Rear-Wheel DRIVE is available without priority or ration release. COMES COMPLETE WITH 8 NEW TIRES. Mail the coupon today for full descriptive data and performance details.

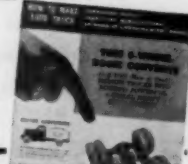


*

IDEAL FOR: Logging • Mining • Lumbering • Oil Production • Limestone Spreading • Sand and Gravel Hauling • Dump Truck Work • General Hauling • Road Maintenance • Street Flushing • Gas and Oil Transport • Ready Mix Concrete • Coal Hauling • Bulk Milk Hauling

The ODT, recognizing the importance of the THORNTON Four-Rear-Wheel DRIVE, allots 8 new tires with each Thornton unit. You get them for your truck when the unit is installed.

FREE: Mail the coupon for descriptive folders and full details about the Thornton Four-Rear-Wheel Drive.



EVERY
THORNTON 4-Rear-Wheel DRIVE
INCORPORATES A
THORNTON Locking DIFFERENTIAL
ALSO AVAILABLE FOR TRUCK AXLES

Thornton Tandem Co.

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Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

Name _____
Address _____
City _____ State _____
Make of Truck _____ Year _____
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Here a new science attacks an old problem



Cylinders in engines usually get a pretty raw deal. They have to take more grueling punishment than any other part of the engine. They . . . and the rings . . . bear the brunt of the blame when engines lose power.

Here, in the Van der Horst Research and Engine Testing Laboratories, we are continuously attacking this old problem of wear. The new science of PORUS-KROME processing is attuned to the needs of the various types of engines. Tests are run in several types of engines to determine the degree and type of porosity which will give the maximum wear resistance. Every development or change in PORUS-KROME processing is forthwith scrutinized by the

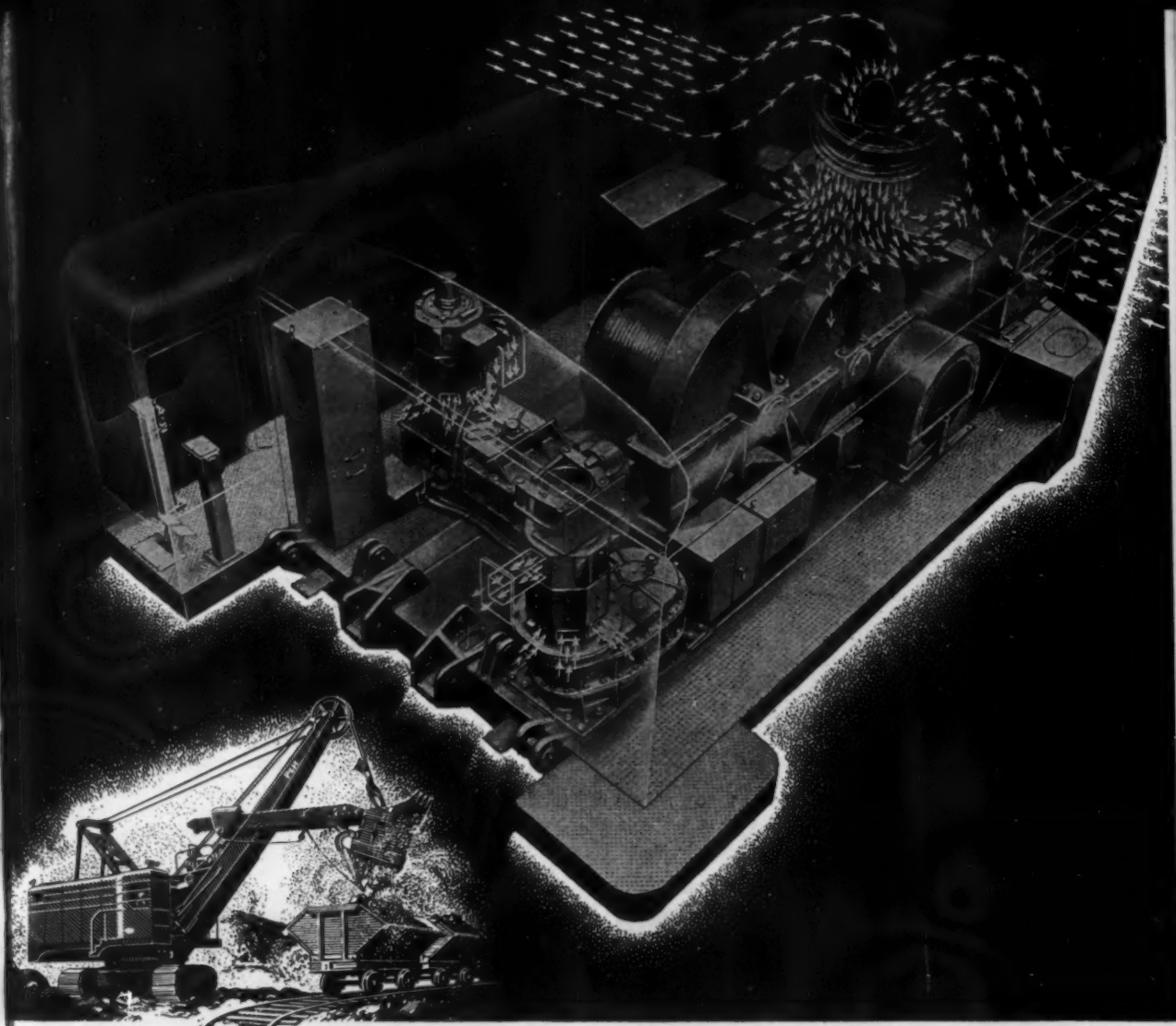
"Lord High Inspector" . . . the engine.

Let's work out *together* a square deal for *your* cylinders. Our engineers will gladly develop with your engineers the specifications which will multiply cylinder life 4 to 20 times . . . ring life 3 to 5 times. The entire facilities of these laboratories are committed to solving the problem of cylinder wear for engine manufacturers.

Even though building of engines for general use is still restricted, it is none too soon to plan for the use of PORUS-KROME in postwar engines. A request from you will bring complete information about PORUS-KROME. *Van der Horst Corporation of America, Olean, New York, Cleveland 11, O.*

PORUS - KROME . . . *Good for the Life of your Engines*





How Saboteurs are FILTERED OUT!

It's a smart electric shovel that guards against such enemies as dust, dirt and grime. Their annual toll runs into mighty big figures—in reduced operating efficiency of electrical parts—in damage to equipment—in loss of productive time. On the new P&H Electric Shovels, a highly perfected cab ventilating system filters out these air-borne saboteurs. It keeps abrasives out of electrical machinery—keeps down shovel maintenance costs—steps up shovel working time.

Only clean air enters the P&H cab. Drawn in through filter banks by a centralized independent blower unit, the air is circulated to motors and generators. Once used, air is exhausted direct to the outside . . . not recirculated.

Here's an example of the care given to designing every detail of new P&H Electric Shovels in the interests of lower digging costs in open pits. Another example of P&H's 60 years of steady pioneering in applying electrical power to the movement of heavy loads.



**ELECTRIC
SHOVELS**

4465 W. National Avenue
Milwaukee 14, Wisconsin

THE GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT



Users put their **OK** on **FULLER COOLERS**

Up to the present time over 100 Fuller Air-Quenching Inclined-Grate Coolers have been sold, most of which have been put into successful operation. Of this number 40 have been repeat orders, proving that Fuller Coolers have been all that was claimed for them. In fact, many installations have exceeded expected performance. Users have really put their stamp of approval on this equipment.

We are now in position to work with you on any clinker cooling problems you may have. No obligation on your part.

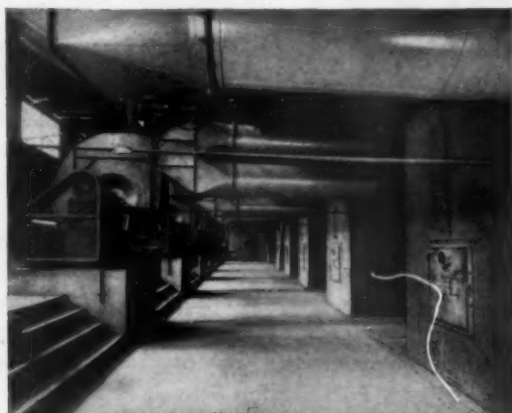


FULLER COMPANY CATASAUQUA, PENNSYLVANIA

Chicago 3 : 1144 Marquette Bldg.
San Francisco 4 : 421 Chancery Bldg.
Washington 5, D. C. : 618 Colorado Bldg.



Fuller Cooler installed in a cement plant. Capacity 2200 barrels per day. Clinker delivered to cooler at 2500 deg. F. and reduced in the final cooling section to approximately 150 deg. F. Fuel oil is used for burning of clinker.



Six coolers installed for cooling Portland cement clinker. Five coolers, each having a capacity of 850 barrels and one having a capacity of 1200 barrels per day, reduce clinker temperatures from approximately 2500 deg. F. to about 100 deg. F.



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... ROTARY FEEDERS AND DISCHARGE GATES ... ROTARY AIR COMPRESSORS
AND VACUUM PUMPS ... AIR-QUENCHING INCLINED-GRATE COOLERS ... DRY
PULVERIZED-MATERIAL COOLER ... AERATION UNITS ... MATERIAL-LEVEL
INDICATORS ... MOTION SAFETY SWITCH ... SLURRY VALVES ... SAMPLERS

CO-18

PLYMOUTH...TRACK CHAMPION

Setting New Records in Transporting Victory Loads . . . Everywhere!

★ Everywhere—at home and abroad—Plymouth Locomotives are delivering war supplies to bolster newly won beachheads; to protect our Armed Forces on the way to Berlin and Tokyo. On production fronts and just behind fighting fronts, Plymouths are busy on the track to Victory!

Moving more tonnage in less time at lower cost—that's Plymouth. In sizes from 2½ to 70 tons, gasoline or diesel powered Plymouth Locomotives are rugged, speedy and powerful. They give dependable, trouble-free service. Maintenance costs are extremely low. Send for complete information—today!



One of the 50-Ton Diesel-Electric Plymouth Locomotives recently purchased by the U. S. Navy

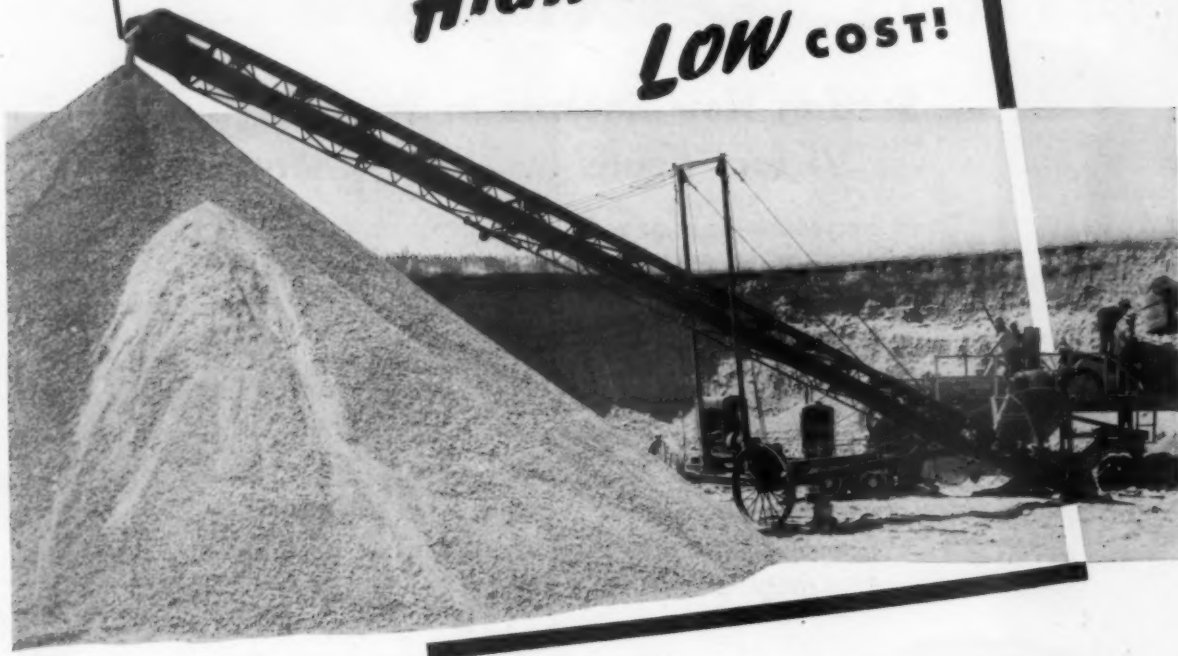


PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL, AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Ingersoll-Rand Co., Plymouth, Ohio, U.S.A.

HOW CONVEYORS ACHIEVE **HIGH** CAPACITY AT **LOW** COST!



• You can stockpile material with less equipment, less horsepower, and less cost than by any other method when you use a Barber-Greene Portable Conveyor.

Capacity is high because material is kept on the move—*continuously*. B-G Conveyors handle the maximum output of crushers easily . . . help you make the most of limited space. Swiveling trucks permit storage in a large semicircle without disturbing the original installation.

To bring your stockpiling costs still lower, this same B-G Conveyor can be used to reclaim your pit and quarry products when the time comes.

If frequent setups, knockdowns, and rearrangements are required, you'll find, too, that a B-G Portable Conveyor saves time, labor and expense.

The sturdy construction of a B-G Conveyor gives you many extra years of service. Standardization of parts assures you of correct and permanent alignment. Belt life is prolonged . . . maintenance costs are negligible.

There are many types and sizes of Barber-Greene Conveyors, portable and permanent, for every material handling job. Barber-Greene Company, Aurora, Illinois.

Barber-Greene Constant Flow Equipment



**AN
IMPORTANT
ENGINEERING
ADVANCEMENT**



Ford

**Ford Announces
NEW DEVELOPMENTS
in the Heavy Duty 100 H.P.**

FORD V-8 TRUCK ENGINE

Here's Good News FOR TRUCK OPERATORS

The Model 59 engine is now offered as original equipment only. It will eventually be made available as a service replacement in Ford Trucks and Commercial units already on the road.

Here are some of the important improvements in this engine:

NEW long-life Tri-Alloy connecting rod bearings . . . **NEW** aluminum alloy pistons with four rings for oil economy . . . **NEW** larger capacity oil pump with more screen area for improved lubrication . . . **NEW** crankshaft rear bearing oil seal . . . **NEW** rust-proofed valve springs . . . **IMPROVED** cooling of valve seats . . . **NEW** flat-type waterproof distributor with full automatic advance and vacuum control . . . **NEW** high efficiency fan . . . **IMPROVED** carburetion . . . **IMPROVED** intake manifold for easy vacuum pipe connections . . . **SIMPLIFIED** design provides easier accessibility for service . . . clutch can be replaced without removing oil pan . . . more parts are interchangeable, reducing the number of service items required.

IT'S HERE—the first of wartime truck engineering developments by Ford to be made available to civilian operators.

An improved Heavy-Duty, 100 H.P. V-8 Engine now powers Ford Trucks and Commercial units which are in limited production for civilian priority holders.

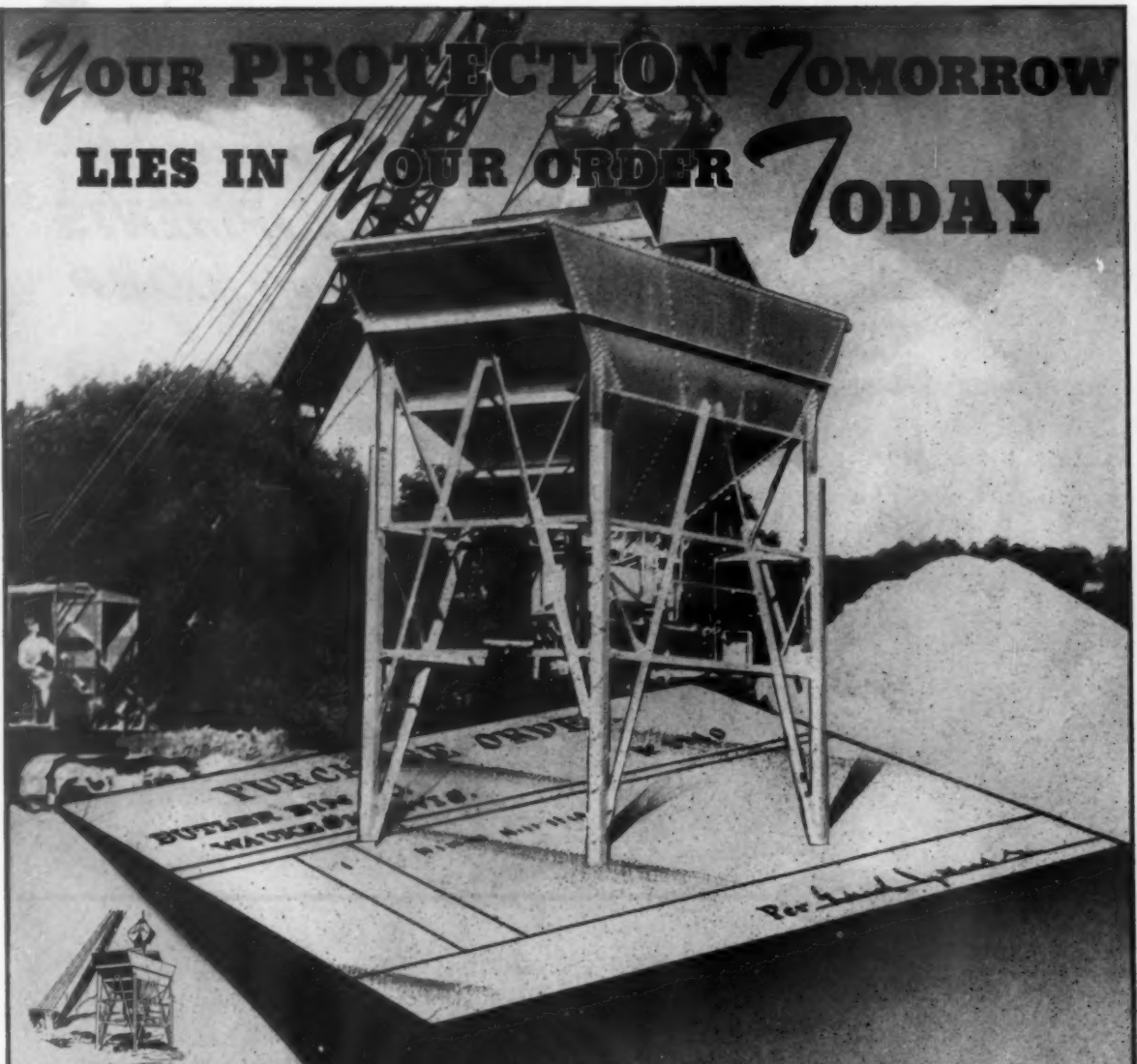
This great power plant is the Model 59. You'll be hearing a lot about its fine qualities. It includes many of the Ford Truck engineering advancements made in response to military needs which are proving valuable in civilian trucking.

These improvements, affecting virtually every operating part of the engine, raise Ford Truck engine performance to new high levels of stamina, economy and efficiency—with new and important *service* benefits of interest to every truck owner and maintenance man.

Read about them in the text at the left.

FORD MOTOR COMPANY

YOUR PROTECTION TOMORROW LIES IN YOUR ORDER TODAY



Stop and analyze now, — today — your future equipment requirements. Analyze in the light of two imperative factors. First, — highway reconstruction alone, to say nothing of the vast new highway programs, involve an equipment demand that will require as much effort on the part of manufacturers as ever did the demands of war. Second, — time schedules, competition and the magnitude of the task will

require equipment engineered to the utmost in capacities and production.

For these reasons, sound, far sighted policy dictates that, — to be assured that the most modern equipment (the finest in high production Engineered Design will be on your jobs when you want them) — your order should be placed now for future delivery — and, of course, placed with Butler.



BUTLER
BIN COMPANY
WAUKESHA, WISCONSIN



INCREASE PRODUCTION WITH JEFFREY REDUCTION

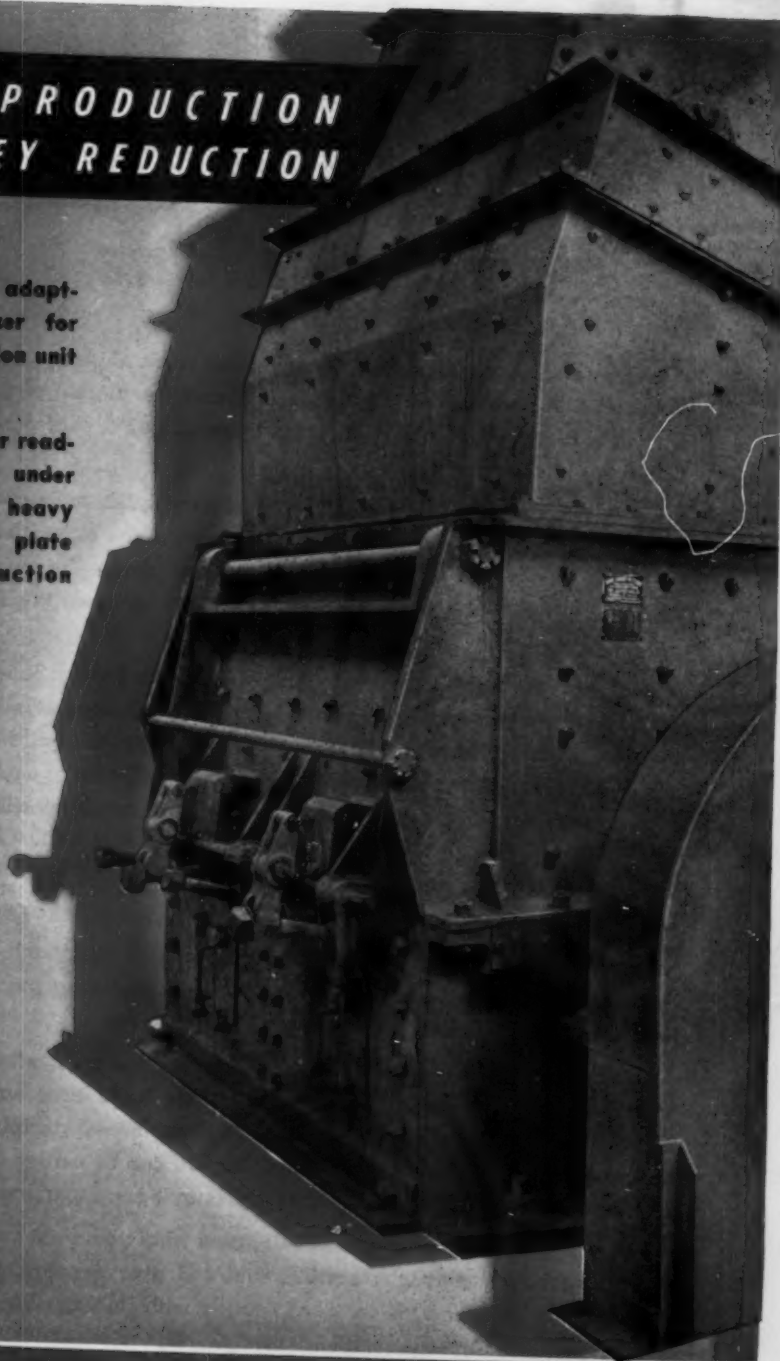
Large capacity and great adaptability make this pulverizer for reducing limestone a champion unit in any plant.

Ideal for making Ag stone or readily adjustable for 2" and under or intermediate sizes. A heavy duty pulverizer of armor plate and welded steel construction throughout.

**JEFFREY
HAMMERMILL**

42" x 66"

Type B



THE JEFFREY

MANUFACTURING COMPANY

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Birmingham 3	Chicago 1	Denver 2	Houston 5	New York 7	St. Louis 3
Portsmouth 14	Rockford 2	St. Paul 13	Washington 12	Philadelphia 7	Salt Lake City 1

**ESTABLISHED
1877**

JM

Many problems...

Four solutions

In every aggregates plant, as in many other kinds of plants, the operations of screening, sizing, separating and dewatering pose a number of problems . . . problems at times unique to that particular installation.

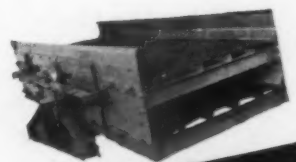
The superintendent knows what he must accomplish to insure having sand, gravel, stone and other aggregates in the capacities and sizes he requires. But—and this is understandable—he may not know precisely what type or types of Screens he needs to get what he wants.

That is where Robins comes in. First of all, each Robins Sales Engineer is an engineer—trained and experienced in understanding objectives and knowing how they can be attained. Next, he has at his disposal four distinct types of Vibrating Screens, each available in a number of styles designed to serve some specific portion of your overall screening demands. In addition, he has a wide selection of Robins Screen Cloth—in meshes and weaves adequate for every purpose.

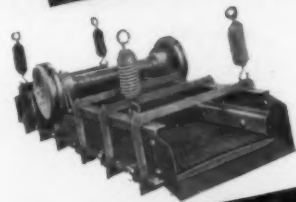
From all of this, Robins is able to supply practically any plant—large or small—with the exact answers to all its screening problems, be they simple or complex.

In turning to Robins for your Vibrating Screens, you are dealing with the company which originated many of the basic ideas employed in modern-day Screen design. (The circle-throw principle, for example, was conceived by Robins.) So you can be certain of recommendations backed by authority and founded on experience.

Perhaps you face a problem now—or know what you want and intend to fill that want with Screens that will give dependable service for a long time. If so, get in touch with Robins. When writing, please address Dept. RP-6.



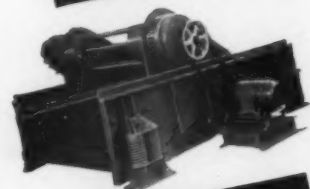
GYREX



VIBREX J



VIBREX M



ELIPTEX

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Founded in 1896 as Robins Conveying Belt Co.
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ROCK PRODUCTS

Labor's Role During Reconversion

REPLIES to our telegrams of May 14, soliciting opinions from producers of rock products as to the early effect on the industry of the European war's end (summarized in this issue), reflected healthy optimism for the latter part of the year and for 1946. Germany's unconditional surrender has generated enthusiasm for a sustained business revival that likely will assume record proportions when the construction industry is set free.

Lack of manpower has weighed heaviest on the industry and will continue the most serious obstacle to high production for the next few months. It is not probable that returning war veterans and men released through cutbacks in war production in 1945, will swell the ranks of the type of labor employed by the rock products industry, the construction industry or other customers of the rock products industry.

Labor Shortages

It has been predicted on good authority that 2½ million men will be out of jobs by the end of 1945. There will be serious labor shortages in certain areas and unemployment already is developing in others. Yet, labor shortages will continue to exercise control over production for, in many areas, high paying types of employers will out-compete other industry in hiring workers. With the reclassification of labor by War Manpower Commission standards, workers in some cities will be set free to shop around for jobs that pay most and the low wage industries will stand to lose employees.

Industries which must compete for labor with the oil, automobile, rubber and other high-pay employers will clamor for increases in wage ceilings and will have the support of plant unions. No union is likely to sit by and lose fees without squawking long and hard. That will fall in line with the War Labor Board's expressed desire for high post-war "take-home" wages comparable to wartime wages for work of similar classification.

How many workers laid off by war plants will really want to work for awhile or at all? When Ford's Willow Run plant laid off men, the local U.S.E.S. discovered the workers were very choosy when it came to signing up for new jobs. They did not want to face early discharge from new war jobs and many expressed a desire to return to their farms, or to go to college or, having paid off the family mortgage, to take lengthy vacations.

The quality of workers released through early cutbacks isn't likely to be the best. First to be lopped off will be the dilatory worker, the irresponsible absentee and the trouble-maker. The rock products industry

has suffered along with many from those characters and wants no more of them.

When unemployment becomes general, and only then, which likely will come when the Japs surrender unconditionally, and when men are really looking for work, will industry be in a position to achieve capacity production. That condition, which could come with dramatic suddenness, would signal the start of large scale construction.

What then will the industry have to offer a good class of labor? Men have become accustomed to good job conditions in plants of the big corporations—conditions that are very rare in the rock products industries. All divisions of the rock products industries might well follow the lead of some of the big cement companies with vision, that have provided workers with clean plants in which to work, showers and toilet facilities, parking lots, medical attention and other necessities, conveniences and services. Labor relations undoubtedly will assume greater proportions in our post-war world.

Pressure likely will be brought to amend the Fair Labor Standards Act to provide for a higher minimum hourly wage under the guise of "more purchasing power," to adjust wages in the South more nearly in line with northern standards, and various devices, including bonuses and incentives, will be invented to circumvent the Little Steel Formula.

Material Shortages

Shortages of lumber and other essential construction materials should, and likely will, be corrected before all construction will be allowed, and labor to make those items available must be allocated so that projects already designed can be built. Since vast construction projects already designed to the tune of 6½ billion dollars are unlikely to be ready to start until unemployment becomes serious, now is the time for the construction industry to really prepare for the time when it can achieve its normal level of 11 percent of total national income.

In recognition of the nation's purpose, production of a record volume of high quality goods at low prices and high wages, the rock products industry must get its house in order. Our telegrams indicated that mechanization and modernization will increase the man hour unit output in the post-war plant.

Bror Nordberg

YOUR
Construction

... AND
OURS!

Your construction job calls for the best you can buy in modern air tools. Our job is to build them for you. Take the L-57 and L-47 rock drills for example, with their modern design and Dual Valve. Air is used more efficiently and a definite "cushion control" is set up. Here's how it works: The correct volume of air to give maximum striking power is admitted behind the piston; then the valve is closed and the piston is propelled by air expansion; AFTER the piston has delivered its full force of blow to the steel, the reverse valve opens and delivers the correct amount of air ahead of the piston to give a return stroke with strong rotating power. Because the Dual Valve permits complete control of the air during the entire stroke-cycle of the piston, the air is used more efficiently and premature admission of live air ahead of the piston (which reduces the force of blow) is not necessary. The Dual Valve gives Sullivan drills a combination of high drilling speed, low air consumption and ease of operation.

For complete details on Sullivan Hand Held Drills and other Sullivan equipment for contractors, see the nearest Sullivan distributor or branch office. SULLIVAN MACHINERY COMPANY, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Company, Ltd., Dundas, Ontario.

PRODUCTS:

Portable Compressors • Rock Drills • Wagon Drills • Core Drills • Portable Hoists • Paving Breakers • Trench Diggers • Sheeting Drivers • and other Pneumatic Tools

A world-wide organization . . . established 1851

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Job



L-57

L-47

The Sullivan L-47, (45-lb. class), is similar in design to the L-57 and has the drilling speed and power of the average 55-lb. drill with holding qualities comparable to the average 55-lb. drill.

- ★ FOR HIGH SPEED DRILLING
- ★ LOW AIR CONSUMPTION
- ★ EASY OPERATION
- ★ LOW MAINTENANCE

★ ★ ★ Washington NEWS

IMPORTANT CHANGES have been effected in the procedures under L-192 order of the War Production Board as amended May 17, in that all provisions dealing with the procurement of repair parts are now eliminated and the items of equipment subject to release by the Construction Machinery Division are curtailed to only a few items.

Executive Secretary V. P. Ahearn in a recent letter to members of the National Sand and Gravel Association pointed out that they need be concerned only with the provisions of Section (c) of L-192. This section provides that before a purchase order is placed for the items of equipment on List 2 of L-192, the purchaser must submit a WPB-1319 application to the nearest W.P.B. field office. If recommended for approval by such office, the application comes to Washington for consideration by the Construction Machinery Division which must release the equipment before a purchase order can be placed. WPB-1319 or WPB-541 are filed in the ordinary manner, WPB-541 applications being processed through field offices for final action and WPB-1319 applications are submitted directly to the Mining Division. W.P.B. has announced the revocation of L-53 covering procurement of tracklaying tractors, and L-53 (b) covering procurement of repair parts for tracklaying tractors.

Relax L-41 Restrictions

War Production Board has issued Directive 5 which serves to relax L-41 restrictions on construction. The text of the order follows:

"Application for permission under paragraph 1075.1, Order L-41, to do construction which is necessary to the setting up of workable lines of production for civilian products may now be filed and may be approved if the construction will not substantially interfere with the war effort. Approval will not be given unless the following conditions are shown to exist:

"a. It is necessary to do the construction or acquire the facilities before the civilian production can be started, and postponement of construction would result in unduly delaying production when restrictions are removed.

"b. The construction and facilities are a relatively minor addition to or alteration of the applicant's plant.

"c. The construction and facilities are no more than what is needed for

production at the minimum economic rate.

"d. The construction and facilities are not for replacement or improvement of existing facilities which are adequate though less efficient.

"e. The product which the applicant will manufacture must generally be one which is needed for the civilian economy.

"f. An application for such construction on Form WPB-617, clearly marked on the face of the application 'Reconversion Preparation' should be filed in the regular manner. A complete statement regarding each of the above must be given."

Clarify WPB Appeals

W.P.B. has amended Priority Regulation No. 16, effective May 3, and added Direction 1 to provide for (1) more accurate definition of "appeal" as applied to "appeals from administrative actions" as well as "appeals from orders and regulations," (2) a clearer understanding of the distinction between "appeals from orders and regulations" and "appeals from administrative actions," and (3) methods of filing appeals as well as complete instructions as to what information must be submitted with all appeals.

Lime Prices

Effective May 12, the O.P.A. has permitted an increase of 65c per net ton in the f.o.b. plant ceiling prices for all building, chemical and industrial lime, except agricultural lime, produced in Virginia, North Carolina, South Carolina, Georgia, Alabama, Tennessee, Mississippi and Louisiana. The 65c per net ton increase may be added to the producer's March, 1942, price. On April 12, the O.P.A. permitted an increase of 45c a ton in the same classification of lime to producers in Clark, Delaware, Franklin, and Preble Counties of Ohio.

I.C.C. Gravel Weighing Orders

Two orders were issued by the Interstate Commerce Commission vacating previous orders prohibiting the weighing of gravel in carloads. One case involving gravel in carloads for Barksdale Field, Louisiana became effective May 3, and the other case involving Austin Bridge Co., Daingerfield, Texas, became effective on the same day.

Phosphate Rock Prices

The O.P.A. has added a new paragraph at the end of Appendix B(2) of RMPR 240 to read as follows:

Guaranteed fineness. A charge of 25c per ton may be added for a guaranteed fineness of not less than 85 percent through a 300-mesh screen, when such guaranteed fineness is requested by the buyer. This amendment was made effective April 30.

Construction Machinery

While military requirements for construction machinery will fluctuate after V-E Day, the Construction Machinery Division of the W.P.B. points out in a release dated May 3 that a reasonably steady demand for civilian use may be expected and the industry will be called upon in 1945 to maintain production at or near present levels. The value of construction machinery shipped in 1944 was about \$820,000,000, an increase of about \$100,000,000 over 1943. Tracklaying tractors constituted 37 percent of the total production and were valued at approximately \$300,000,000. The 1944 production program called for 37,041 units, of which 34,066 were produced. Allied tractor equipment produced in 1944 amounted to about 10 percent of the production and totaled \$85,000,000. Tractor-mounted cranes and shovels produced in 1944 totaled 9359 units, 1945 schedule, 5400 units; Dozers in 1944, 28,268 units, 1945 schedule 22,000 units. Power cranes and shovels accounted for about 25 percent of the industry's 1944 production and amounted to 2739 truck-mounted units and 7313 crawler-mounted units. The 1945 schedule calls for 4736 truck and 6,808 crawler-mounted units.

Arizona Block Prices

O.P.A. has announced under Order G-7, MPR 188, that prices of concrete block in the counties of Maricopa, Pima, and Pinal, State of Arizona have been adjusted as follows:

Dimension	F. o. b. plant, maximum price per 1,000 blocks	Additions for delivery, miles from producers plant	
		Within 5 miles	Beyond 5 miles
4x2x8 ...	Cap \$12.50	\$2.50	\$3.50
4x2x12 ...	Solid 25.00	3.50	4.50
4x4x12 440	50.00	4.00	6.00
4x6x12 50	854 70.00	5.00	6.00
4x8x12 60	63 80.00	6.00	7.00

Other sizes. The adjusted maximum price of a concrete building block of a size not listed in paragraph (b) shall be the adjusted maximum price provided in that paragraph for the nearest size of the same type (that is, either hollow, cap or solid) multiplied by the ratio of the cubic content of the unlisted block and cubic content of the comparable block.

NEARLY 3 YEARS' SERVICE

Where the Kiln is hottest . . .

*and years of
service left!*



Unretouched photographs of B&W nose ring castings installed in May 1942 and still on the job. Castings were not cleaned before photographing.



B&W ALLOY CASTINGS

In the metal-torturing temperature of a busy cement kiln's firing end, these B&W Nose Ring Castings have been in service nearly three years. Castings previously installed on the same kiln gave up after about eight months, but these B&W Alloy Castings are still in good condition—with more years of punishment-absorbing service still in them!

That's evidence of how B&W Alloy Castings stand up under severe, high-temperature conditions; how they reduce costly, time-consuming repairs, and replacement shut-downs.

B&W Alloy Castings are available in analyses to meet almost any requirement: resistance to corrosion, oxidation, abrasion, or other adverse conditions encountered in equipment for rock products operations. They can be furnished in practically any shape and weight, for service temperatures up to 2000 F., under conditions requiring high creep strength, consistent with long-time stability.

These Alloy Castings are produced in B&W's modern foundry, which is equipped with electric induction furnaces, heat-treating facilities, electric welding apparatus and X-ray inspection equipment.

Experience gained in helping others to solve equipment problems with B&W alloy castings is available to you without obligation.

S-40

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Rocky's NOTES

A Problem in Organization

IT HAS BEEN my privilege, recently, to listen to an informal discussion of the organization problems of the lime industry. The matter was of especial interest because on this page in our February issue were some remarks which naturally led to the inference that the lime industry had not made the most of its opportunities during the last quarter century. We did not intend to mean that individual lime manufacturers had not made progress, but rather, that the lime industry as whole had not been able to organize as effectively as it seemed possible to do in order to take full advantage of new industrial opportunities opened up by the end of World War No. 1.

Long observation and considerable cogitation have led to the conclusion that there are extenuating circumstances; that the National Lime Association has no parallel to follow; that a considerable amount of experimenting in organization was necessary; that experiments in business are not popular with business men. Hence, the financial support the National Lime Association received from time to time fluctuated considerably, and a far-sighted, long-range program of activities was never possible.

Under the circumstances the Association has probably done as well as could have been expected. The time has now come, however, when developments and changes brought about by the end of our present world war need the study of the very best brains in the industry.

Too Much Promotion

Influenced probably by other basic commodity industrial associations, such as the Portland Cement Association, the National Lime Association has been looked upon as mainly a promotional and research organization. The two were generally considered in the same breath, because the objective of research, as placed before the members over and over again, was to increase the uses and sale of lime. Of course, that is the ultimate objective of nearly all industrial research on any commodity; yet, there is such a thing as "holding a nickel so close to the eye that one can not see the dollar beyond it."

The Association has done some but

not enough fundamental research on the nature and properties of lime; how or why various limes acquire their special characteristics. That is not to say that much such research work has not been done by interested individual companies and individual scientists, but no serious attempt was made by the Association to coordinate or interpret the results of such research. It was satisfied merely to report them to its membership. The Association has missed a grand opportunity to be the authoritative coordinating center and clearing house for all the scientific data gleaned from a voluminous literature on the properties and uses of lime—not merely general information for dissemination to the public, but exact information for individual industrial users of lime.

It seems as if most of the promotional activities of the Association have long been directed to promoting lime as lime. Of course, it was always recognized that there are many varieties of lime as well as many uses, and that all limes are not adapted to all uses. That this complicates promotion is obvious, and a sales promotional industrial association patterned after the P.C.A. or other organization which had a single standardized commodity to promote will not answer the problem of the lime industry.

We did at one time believe and advocate that more effort should be made to standardize lime, but aside from the fact that the Committee on Lime of the American Society for Testing Materials is attempting now to write an over-all specification for chemical lime, little progress in this direction has been made in the last 25 years.

Divisional Organization

Five major functional divisions of lime are generally recognized: (1) agricultural; (2) construction; (3) chemical or industrial; (4) finishing lime (plaster); (5) masonry mortars. Construction, taken as a whole, of

course covers the last two; but in this case it has a narrower meaning—the use of lime in concrete, for base course plaster, for lime mortar, for stabilizing pavement subgrades, etc. For these purposes any lime may be used; for masonry (cement and lime) mortars and for finishing lime, any old lime product may not be used.

The Association's directors have tried to distribute the organization's common funds for research and promotion equitably among these five major fields. Quite naturally this has been a thankless and unsatisfactory job, where rival producers, and many who are not producers in certain fields, have inadequate funds to work with. In addition to this, the attempt has been made to provide appropriate cooperative activities through local (geographical) districts. It has not worked out satisfactorily except where such local groups operate entirely independently of the National Association. Anyhow, it tends to accentuate business rivalries between groups in the same industry, which is bad.

Possible Solution

The one thing all lime manufacturers have in common is their manufacturing or production problem. This has never received adequate attention from the National Lime Association, which is always dominated by sales-minded rather than production-minded executives. Therefore, if the basic dues of the association for membership were based on assistance by the association in solving production and operating problems (including labor relations), those dues would be founded on a basic need and a basic service to all lime manufacturers, including chemical and paper companies which make their own lime but are not commercial lime producers.

Within the basic association fabric thus formed, various interested manufacturers could organize divisions along the five functional lines already noted. These five groups could be organized as divisions or committees, with their own officers and executive or advisory committees, raise their own research and promotional funds, and pursue such activities as desired, subject of course to the over-all supervision of the president and board of directors of the National Lime Association. Any member of the Association would then be free to join in one or all or none of these divisional activities.

It seems to us that such a type of organization is better suited to the peculiar problems of the lime industry than any yet tried.

Nathan C. Rockwood



Getting the Most Out of a Bulldozer

CARVING airstrips out of jungles and dozens of equally difficult assignments have proved how expert the Seabees are in getting the most out of a bulldozer. Here, on an "easy" job, one of them builds a causeway to enable the crew of an LST to unload supplies.

On a Pacific island or here at home, getting the most out of bulldozers—and other types of construction equipment—depends not only on the operator's skill but also on effective lubrication. Maintenance-wise contractors everywhere know effective lubrication is always assured when they use Texaco.

Texaco Ursa Oil X** for Diesels and heavy-duty gasoline engines, for example, assures better compression and combustion, greater fuel economy and more power because special additives give this heavy-duty oil the valuable properties of detergency and dispersion.

Its detergency keeps piston rings free and engine parts clean. Its dispersive ability holds deposit-forming materials in suspension until drained. Ursa Oil X** resists oxidation, protects alloy bearings and prevents scuffing of rings, pistons, cylinders.

For quieter-running, longer-lasting transmission and differential gears, use Texaco transmission and differential lubricants.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write:

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THEY PREFER TEXACO

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TEXACO Lubricants and Fuels

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS

Wins D.F.C.

LT. WILFRED R. BENDY, formerly a cement engineer of Claverack, N. Y., now stationed with the 6th Ferrying Group, Long Beach Army Air Field,



Lt. Wilfred R. Bendy

has been presented with the Distinguished Flying Cross for hazardous flights across the Himalaya Mountains between India and China. Lt. Bendy, who has completed 91 round trips over the most treacherous air route being flown by the Air Transport Command, returned to the United States in October of last year. He has logged more than 2200 flying hours and is now a first pilot on a regular scheduled run for the Ferrying Division's Military Air Transport Service, but plans to return to the cement business at the end of the war.

President Consumers Co.

JOHN J. O'LAUGHLIN, formerly vice-president of Consumers Co., Chicago, Ill., has been elected president to fill the vacancy created by the resignation of William J. Kelly. DAVID F. MCKENZIE has been made vice-president in charge of all fuel divisions of the company. He was formerly in charge of wholesale coal.

Sales Manager

W. B. SIPPY, assistant sales manager of the Columbia Cement Division of the Pittsburgh Plate Glass Co., Zanesville, Ohio, has been appointed sales manager. Mr. Sippy began his career with the company 28 years ago as a clerk in the Pittsburgh office. He has been associated with the sales department of the Columbia Cement Division for the past 19 years, serving as assistant

sales manager for four years prior to his present position. CHESTER R. STEENBERG has been appointed assistant sales manager, with headquarters in Columbus, Ohio. He started with the Columbia Cement Division in 1928 after having been previously associated with the West Penn Cement Co., Universal Atlas Cement Co., and the South Western Cement Co. at Dayton, Ohio.

Manager Block Plant

EDMUND A. SMITH, formerly associated with Cinder Block Co., Richmond, Va., has been appointed manager of the Kansas City, Mo., plant of Cinder Concrete Products, Inc. He will be in charge of production. GEORGE W. GOELITZER, vice-president, is in charge of sales.

Asbestos Appointments

GEORGE H. RHINEHART has been elected president of Asbestos Limited, Inc. RALPH A. BADLEY was made vice-president in charge of sales, and E. VAN HORN secretary and treasurer. These appointments were made in accordance with the instructions and desire of the late president, N. E. Newman.

Awarded Wason Medal

HARRISON F. GONNERMAN, manager, research laboratory, Portland Cement Association, Chicago, Ill., has been awarded the Wason Medal of the American Concrete Institute for "noteworthy research."

Downs Jap Plane

CAPT. BRUCE S. CAMPBELL, JR., son of Bruce S. Campbell, Sr., president of Harry T. Campbell Sons Corp., Towson, Md., is officially credited with shooting down a Japanese plane in the first fighter-escorted B-29 raid on Tokyo. Flying a P-57 Mustang, Capt. Campbell joined the B-29s over his Seventh Fighter Command base on Iwo Jima and accompanied them to the Japanese homeland and back. Over Tokyo, he found himself in the thick of the air battle during which 50 Jap planes were destroyed and 24 others disabled. Over the target four Jap fighters started to attack the American formation, coming in from above head on. Capt. Campbell turned his plane directly into their path and started firing, and one of them suddenly broke off at right angles, burst into flames and began a steep dive. A few days later he took part in the first fighter plane attack on the enemy air field at Kanoya, which is 750 miles from Iwo Jima. Capt. Campbell entered the Army Air Force in 1940 and has been overseas for more than two years. In the battle for the Marshall Islands

he was shot down and drifted in a rubber boat on the Pacific for three days and three nights, when he was picked up by an American destroyer.

A brother, Capt. Tyler Campbell, who was cited for gallantry in action in the Italian campaign when his unit liquidated the German General Maj. Gen. Schmidt and his staff, was killed in action on September 21, 1944. A news item about his gallantry and death appeared on page 51 of the December, 1944, issue of ROCK PRODUCTS.

Another brother, Robert M. Campbell, is with the American Volunteer Field Service in Europe.

Masonry Assn. Officer

PHILIP PAOLELLA, treasurer of Plastcrete Corp., Hamden, Conn., has been elected vice-president of the New England Concrete Masonry Manufacturers, Inc., Boston, Mass. GENO COMMASSI, Shrewsbury Concrete Block Co., Auburn, Mass., is president of the Association, and WALTER M. BURSE is secretary-treasurer.

Quartz Sales Official

EDWIN A. RUSSELL, director and sales manager of the Philadelphia Quartz Co., New York, N. Y., has been named vice-president in charge of sales, with full administration of the company's domestic sales.

Queenston Officials

R. G. L. HARSTONE has been elected president of Queenston Quarries, Ltd., Hamilton, Ontario, Canada. A. MICHIE was named vice-president and general manager; D. E. STEELE, secretary; and C. H. DOOLITTLE, treasurer. The following directors were ap-



R. G. L. Harstone

pointed: C. H. Doolittle, R. R. Evans, H. P. Frid, R. G. L. Harstone, D. H. Henderson, and A. Michle.

Heads Institute

WALTER S. HAMME, agricultural sales manager for National Gypsum Co., Buffalo, N. Y., has been elected



Walter S. Hamme

president of the Quality Lime Institute after serving two years as vice-president. He succeeds D. L. Shroyer of the H. E. Millard Lime Co., Annville, Penn. Mr. Hamme has had 20 years of experience in the lime industry. Starting out as a salesman, he has held positions with various lime concerns and since 1935 has been affiliated with the National Gypsum Company. In 1941, he was appointed sales manager of all agricultural lime products manufactured at the company's York, Bellefonte and Luckey lime plants.

Transferred

WADE W. POSTELLE, local auditor of the Leeds, Ala., plant of the Universal Atlas Cement Co., New York, N. Y., since 1942, has been transferred to the Independence, Kansas, plant, to succeed Clarence Graves, Jr., who has resigned. Mr. Postelle joined the company at Leeds in 1920 and Mr. Graves joined at Independence in 1923, serving as auditor since 1938.

A.C.I. President

DOUGLAS E. PARSONS, Chief of Masonry Construction Section, National Bureau of Standards, Washington, D. C., is the new president of the American Concrete Institute. Mr. Parsons has served on both technical and administrative committees and as a member of the board of direction. He also has served on the publications committee since 1940 and as

chairman since 1941. HARRISON F. GONNERMAN, manager, research laboratory, Portland Cement Association, Chicago, Ill., and STANTON WALKER, director of engineering, National Sand and Gravel Association, Washington, D. C., were elected vice-presidents. ALEXANDER FOSTER, JR., vice-president, Warner Co., Philadelphia, Penn., was elected director of the Third District, and HENRY L. KENNEDY, manager, Cement Division, Dewey & Almy Chemical Co., Cambridge, Mass., and MYRON A. SWAYZE, director of research, Lone Star Cement Corp., Hudson, N. Y., were re-elected directors of the First and Second Districts, respectively.

Heads Lime Concerns

KENNEDY E. ELLSWORTH, director of the Arrowhead Lime and Chemical Co., and district manager of the United States Lime Products Co., Los Angeles, Calif., is now head of the combined operations of the two companies. He will continue to make his headquarters in Los Angeles. CARROLL STEPHENS remains in charge of the U. S. Lime Products Co.'s operations at Sonora, Calif.

C.E.D. Chairman

L. T. McCOURT, president of the Fischer Lime and Cement Co., Memphis, Tenn., has been appointed chairman of the Memphis Committee for Economic Development, succeeding Charles Poe who has resigned because of ill health. The C.E.D. is planning a commercial survey of Memphis for the purpose of determining post-war employment and expansion plans.

Elected Vice-President

KENNETH W. HUFFINE, manager of the Johns-Manville Products Corp. plant at Waukegan, Ill., has been elected vice-president of the newly organized engineering department, with headquarters in New York, N. Y. Mr. Huffine formerly held an engineering position with the Banner Rock Products Co., which merged with Johns-Manville in 1929. C. R. WIKEL, who has been Mr. Huffine's assistant, will succeed him as plant manager at Waukegan, Ill.

Joins Anchor

RICHARD T. CARPENTER, former structural field engineer of the Portland Cement Association in the western and central New York region, has become associated with Anchor Concrete Products, Inc., Buffalo, N. Y.

Association Secretary

CLAUDE L. CLARK, secretary of the Ohio Ready Mixed Concrete Association and the Ohio Sand and Gravel Association, has been appointed secretary of the Ohio Building Materials Dealers' Association, Columbus, Ohio.

Promoted

HARVEY T. GRACELY, whom old-timers will remember as advertising manager of The Marion Steam Shovel Co., and one of the seven founder members of the Manufacturers' Division of the National Crushed Stone Association, has been elected vice-president of his company. He has been sales manager for a number of years.

Pacific Officials

C. B. FLICK, secretary-treasurer, and A. G. LANG, chief engineer, of the Pacific Portland Cement Co., San Francisco, Calif., have been named vice-presidents of the company. J. A. MCCARTHY was re-elected president; J. H. COLTON, JOHN D. MCKEE, and JOHN G. SUTTON were re-elected vice-presidents, and all directors were re-elected.

Joins Paper Concern

BURTON A. FORD, former secretary and general manager of the National Lime Association, Washington, D. C., has resigned as sales manager of the St. Regis Paper Co. to become general manager of The Thos. Phillips Co., Akron, Ohio. Prior to his connection with the National Lime Association (1922-1926), Mr. Ford was division manager of the Virginia Carolina Chemical Corp., Alexandria, Va. He joined the Valve Bag Co. as sales manager in 1928 and a year later, when the company was taken over by the St. Regis Paper Co., was transferred to New York where he continued as sales manager of the Valve Bag Co. division, and aided in the development of bags for fertilizer and other chemicals. From April, 1943, to January, 1944, Mr. Ford was industrial specialist in charge of paper shipping sacks in the paper division of the War Production Board in Washington, a position he still holds with the title of consultant.



Burton A. Ford

Southern California Producers Organize

SOUTHERN CALIFORNIA producers of rock, sand and gravel, and the ready mixed concrete operators have formed two trade associations of the respective industries with offices located at 835 H. W. Hellman Building, Los Angeles.

The object of these associations is to provide instrumentalities through which the members of the industries may coordinate their efforts in the handling of problems of common concern to the industries and, in general, to perform such acts and services for the industries and their members as may be more satisfactorily performed by group, rather than by individual action.

The names of the organizations are the Southern California Rock Products Association and the Southern California Ready Mixed Concrete Association. They are operated in a similar manner to and in close cooperation with the National Associations of both industries. Regular monthly meetings of the boards of directors are held as well as special meetings for the consideration of pressing matters. The activities of the associations include the handling of labor relations, legislation, taxation and the many technical problems presented by the operations of the industries.

Officers, directors and members of the Southern California Rock Products Association are as follows:

Robert Mitchell, Consolidated Rock Products Co., president.
Harry E. Bender, Azusa Rock & Sand Co., vice-president.
M. F. Joyce, Arrow Rock Co., treasurer.
W. J. Van Valkenburgh, Blue Diamond Corporation.
L. H. Chandler, Chandler's Palos Verdes Sand & Gravel Co.
Paul C. Graham, Graham Bros., Inc.
John D. Gregg.
Dewey Manning, Manning Bros. Rock & Sand Co.
H. N. Goodreau, Owl Rock Products Co.
E. R. Sidebotham, Edw. Sidebotham & Son.

Officers, directors and members of the Southern California Ready Mixed Concrete Association are as follows:

Paul C. Graham, Graham Bros., Inc., president.
George L. Eastman, Security Materials Co., vice-president.
L. Glenn Switzer, Transit Mixed Concrete Co., treasurer.
M. F. Joyce, Arrow Rock Co.
Harry E. Bender, Azusa Rock & Sand Co.
S. H. Bacon, S. H. Bacon Materials Co.
W. J. Van Valkenburgh, Blue Diamond Corporation.
Robert Mitchell, Consolidated Rock Products Co.
E. A. Lockett, E. Lockett & Son.
E. R. Sidebotham, Edw. Sidebotham & Son.

The executive secretary of both associations is H. G. Feraud who was formerly associated in an executive capacity with the Los Angeles Stone Co., the Southern California Rock & Gravel Co., the Union Rock Co. and



Left to right: J. H. Robinson, Rostang Dubeau, J. E. Dorion, and Victor J. Azbe

the Reliance Rock Co., having had 30 years experience in the production and sale of rock, sand and gravel.

Open Gravel Pit

THE HALLETT CONSTRUCTION CO. has made preparations for opening a gravel pit six miles east of Pipestone, Minn., in the Rock River area. A considerable quantity of equipment is being installed, and it is understood that the company plans to operate on an extensive scale. The Hallett concern has headquarters at Crosby, Minn.

Start Products Plant

M. N. PETTIT AND J. H. WEILER of Sequim, Wash., have formed a new company which will be known as Sequim Concrete & Products Co. The partners in the new enterprise have leased a gravel pit on the Jess W. Taylor farm between Sequim and Dungeness where the plant will be set up.

Buy Quarry Equipment

HOUGHTON STONE CO., Kingston, Mo., has purchased some new equipment for its quarry. The machinery includes a 15x36-in. Diamond jaw crusher with a capacity of 400 to 500 tons of rock per day, and a 125-hp Caterpillar Diesel to drive crusher.

Completing Gravel Plant

GALLOWAY AND JEFFERY SAND AND GRAVEL CO., Batesville, Ark., is completing a new sand and gravel plant on the bank of White River near the Stadium. Capacity will be over 500 tons daily, according to F. L. Galloway.

Install Block Machine

KRAMER & SCHRADER, Sedalia, Mo., recently installed a new Kirkham vibrator block machine. The company also plans to manufacture concrete burial vaults.

Lime Plant Tour

ENROUTE to the annual general meeting of the Canadian Institute of Mining and Metallurgy, the editor had the good fortune to make the trip from Montreal to Quebec City by automobile, which gave him the opportunity to visit several lime plants in Quebec Province. The accompanying picture was taken at St. Marc where the party stopped to inspect the new Azbe integral gas producer shaft kiln in operation. From left to right are J. H. Robinson, general superintendent, Gysum, Lime and Alabastine, Canada, Ltd.; Rostang Dubeau, superintendent of company's St. Marc plant; our chauffeur, J. E. Dorion, manager, Standard Lime Co., Ltd., Montreal; and Victor J. Azbe.

To Build Ready Mix Plant

F. D. LEWIS AND SON, Greensboro, N. C., plan to erect a new plant on the site of the present plant. This company started production in 1940, and has increased business to the point where more modern facilities are necessary. The new plant will include bulk cement bins, modern aggregate bins, a water meter, bucket elevator, and additional transit mixers to augment the four 2-cu. yd. Rex mixers now in service.

Construct Agstone Plant

DELBERT WHEELER, Topeka, Kans., will be an agstone and aggregates plant one mile north of Williamstown on Highway 24. M. W. Watson, Topeka contractor, is building the plant.

Start Gravel Operations

ANDERSON & SON, Hibbing, Minn., operating as Anderson Aggregate Corporation, recently opened up a gravel pit and installed screening, crushing, and washing equipment on a 24-acre property leased from Western Union College at Le Mars, Iowa.



Cement Production

BUREAU OF MINES reports that production of finished portland cement during March, 1945, totaled 6,398,000 bbl. or 4 percent above production in March, 1944. Production in March, 1945, did not meet demands and stocks decreased 583,000 bbl. from the February, 1945, total. Shipments from mills during March, 1945, reached 6,988,000 bbl., an increase of 12 percent over that reported in March, 1944. Shipments in the first quarter of 1945 reached 16,435,000 bbl. and represent an increase of 1 percent over that reported for the corresponding period of 1944. Mill stocks of finished cement at the end of March totaled 21,581,000 bbl., a decline of 14 percent from the stocks of the corresponding month of 1944. The March total represents not only a decline from the previous months' total but also a continued close adherence to the trend of the 1935-39 average.

The following statement gives the relation of production to capacity, and is compared with the estimated capacity at the close of March, 1945, and of March, 1944:

RATIO (PERCENT) OF PRODUCTION TO CAPACITY	Mar., Mar., Feb., Jan., Dec.,				
	1944	1945	1945	1945	1944
The month.	29.0	31.0	29.0	31.0	36.0
12 months..	47.0	37.0	37.0	37.0	37.0

Shut Down Cement Plants

LEHIGH PORTLAND CEMENT Co. has shut down its plant at Metaline Falls, Wash., for a major repairing and overhauling program, according to District Manager W. G. Perrow. Improvements include replacing tram towers of the mile-long tramway from quarry to mill and relining the kilns.

STANDARD PORTLAND CEMENT Co., Painesville, Ohio, subsidiary of Diamond Alkali Co., has shut down with bins full. Operations will be resumed as soon as construction and road building programs get under way.

Big Construction Projects

WHILE current construction projects are down to a relatively low level as compared with the 1941-1943 period, there have been some very substantial contracts placed recently to meet changing demands from the war fronts. For example, four large truck tire plants have been authorized by the War Production Board and some additional plant facilities at other locations. About \$70,000,000 is involved in these jobs. The four companies involved are Goodyear Tire and Rubber Co., Gadsden, Ala., Topeka, Kans., Nashville, Tenn., and Akron, Ohio; B. F. Goodrich Co., Tuscaloosa, Ala.; Firestone Tire & Rubber Co., Pottstown, Penn., Memphis, Tenn., and Akron, Ohio; and Dayton Rubber Manufacturing Co., Dayton, Ohio. Another large project is a new tire plant at Ottawa, Ill., to be built by Inland Rubber Corporation, Chicago, Ill.

One of the biggest construction projects, involving locks and dams, is the plan to spend \$60,000,000 for canalization of Big Sandy River and its Levisa and Tug tributaries in West Virginia.

Reopen Magnesium Plants

THREE MAGNESIUM PLANTS which have been shut down or limited to 50 percent of capacity have been returned to full output at the request of the W.P.B. The plants involved are the Dow Magnesium Corporation plant at Velasco, Texas, which has been held in standby since December 1, 1944; the Diamond Magnesium Corporation plant at Painesville, Ohio, which has been limited to 50 percent capacity since December 31, and the Magnesium Reduction Co., which has been limited to 50 percent capacity since December 31. All properties are owned by Defense Plant Corporation.

Asbestos Developments

JOHNS-MANVILLE CORPORATION, New York, N. L., has announced through President Lewis H. Brown that the company's research laboratory has developed several new products and has made many improvements in old products. A new type of asbestos paper which can be made as thin as cigarette paper has been developed for postwar markets as an insulating material. Other products include a new type asbestos roofing shingle manufactured in strips, a white asbestos shingle for siding purposes, improved asbestos-cement, and panel-type materials for interiors.

Phosphate Production

THE BUREAU OF MINES reports on phosphate production in the western States of Idaho, Montana and Utah. Distribution was 112,565 tons for Idaho and 186,434 tons for Montana

totaling 298,999 tons, with none produced in Utah. The average P.O. content was 32.95 percent and average price at mine \$4.50 ton. The largest producer was that of Montana Phosphate Products Company of Trail, B. C., from their mines in Powell County, Montana.

International Minerals and Chemical Corp. carried on development work in concentration at their test mill at Sherryl, Montana, but made no sales or shipments.

Open Up Quarry

IRVIN LANNING LIME Co., Bolivar, Mo., has moved crushing equipment and a fleet of 16 trucks to the Curtis Zink farm, four miles southwest of Oswego, Kans. Twelve acres of the farm has been leased for quarry operations. Irvin Lanning has A.A.A. contracts to supply agricultural limestone in 10 counties in this area.

Agstone Contract

GARNETT ROCK Co., Garnett, Kans., has been awarded a contract for agricultural lime for 1945 by Anderson County. Additional crushing equipment has been purchased to increase capacity, according to Charles Dunn, superintendent. Typical of prices for agricultural limestone spread on the field are the following: Indian Creek township, the cost spread on the field is \$3.85 per ton, A.A.A. paying \$2.68, the farmer \$1.17; Jackson township, the cost spread on the field is \$2.85, the A.A.A. paying \$1.88, the farmer paying 97c.

Block Conveyor System

WALLACE CONCRETE PIPE Co., Columbia, S. C., plans to install a belt conveyor system to transport masonry units from curing rooms to yard storage. A 16-in. belt conveyor, 80-ft. centers, will extend from the discharge end of the curing rooms into the storage yard. A portable 16-in. Jeffrey conveyor, 18-ft. centers, will allow block to be removed at any point of the stationary conveyor, for transfer to other storage locations.

It is planned to have one man load block to the stationary conveyor, another will transfer the units to the portable conveyor, and a third will remove the block onto the stock pile.

Illinois Agstone Record

DOUGLAS F. STEVENS of the Illinois State Geological Survey advises that reports from producers on agricultural limestone used in Illinois during 1944, have increased the total reported to 3,760,000 tons. Additional reports not yet received, it is believed, will add at least 225,000 tons, making a 1944 total of about 3,985,000 tons. This is an increase of 24 percent over the amount used in 1943, and establishes a new all-time high record in 1944.

CEMENT CHEMISTS—SUPERINTENDENTS

WIN ONE OF THESE PRIZES!

Much of the progress in cement manufacture has come through work done in cement plant laboratories and your observations of manufacturing techniques.

That is why ROCK PRODUCTS has for years devoted its Chemists' Corner to the publication of articles written by chemists in the industry. Now, in further recognition of your important contributions to the cement industry, ROCK PRODUCTS' editors have established a prize competition in which you as a chemist or superintendent will want to participate.

The purpose of the Chemists' Contest is not to make awards for the most monumental types of research performed. Awards will be judged on the basis of the usefulness of your observations or work to your profession . . . on its originality . . . on its value in stimulating other thought or work.

A jury of qualified, unbiased men will judge the articles contributed. Prize-winning articles will be published in the August Cement Issue of ROCK PRODUCTS. In addition to the award money, winners will be paid regular space rates for publication of their entries in the August Cement Number. All other entries that the Editors consider suitable for publication will be paid for at our regular space rates.

Remember, the contest closes July 10. Your entry need not be long, or involved, to qualify for the prize money. So plan now to participate in this contest—and send your entry by July 10.

1st Prize:

WAR BONDS		CASH
\$200.00	or	\$150.00

2nd:

\$150.00	or	\$112.50
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3rd:

\$100.00	or	\$ 75.00
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4th:

\$ 75.00	or	\$ 56.25
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5th:

\$ 50.00	or	\$ 37.50
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Rules of the Chemists' Contest are simple. Your entry can be on any subject of current interest . . . on research projects, work on product quality, sampling and testing, control of operations, the use of grinding aids, air-entrainment, laboratory procedure, practical short cuts and devices for chemists, grinding, or any other chemical process associated with the manufacture of portland cement. All entries must be mailed by July 10.

In case of a tie, duplicate prizes will be awarded.

ROCK PRODUCTS

309 W. Jackson Blvd., Chicago 6, Ill.

HINTS *and* HELPS

Practical Ideas Developed by Operating Men

Chute Cement to Conveyor

READY MIXED CONCRETE CO., Chattanooga, Tenn., has installed a chute which guides the introduction of bulk



Chute below screw conveyor prevents spillage of cement

cement from screw conveyor to belt conveyor. As can be seen in the illustration, the chute permits the cement to be dumped to the center of the belt and prevents spillage at the sides as well as guiding the cement directly to the belt. The belt conveyor, which also handles sand and gravel aggregates, carries the cement to storage bins in the mixing plant. This chute is elevated out of the way when other materials are to be transported by the belt conveyor.

Skip Box Loader

THE ACCOMPANYING ILLUSTRATIONS show a skip box and truck loading arrangement specially designed by the North Carolina Granite Corp., Mount Airy, N. C., for its own use. Stone is sorted and sized in the quarry and loaded into the boxes manually. To save labor and eliminate lifting heavy stone over the side of the box, this skip box was constructed with a V-shaped base so that when placed on the quarry floor, an open side

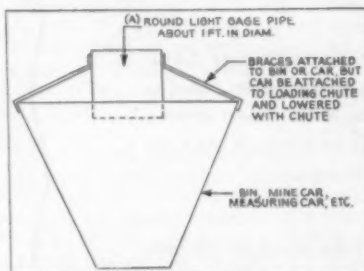
would present itself. Stone is then loaded into the box almost at ground level. The box thus actually has a double base, resting on one when being loaded, and on the other after it has been drawn up onto the truck. When ready for transference to the truck body, the tracks on the truck attachment are slid under the other base of the box. A cable and winch attachment, operated by power take-off from the truck motor, then pulls the box into the truck body. The tracks are attached on a pivot just above the rear wheels of the truck, thus when the loaded skip box passes this pivotal point, the tracks swing down almost parallel to the truck body, allowing the rear end of the tracks to be elevated from the ground. The load of stone is then ready for transference to the plant.

Loading Bins or Cars

By J. F. PRUYN

MANY OPERATIONS waste time and money by filling cars until material spills or else underfill the car. Usually the man in charge of loading cannot see down into the car.

An easy way of avoiding this is shown in the sketch. The material



Arrangement to prevent spilling of bins or mine cars

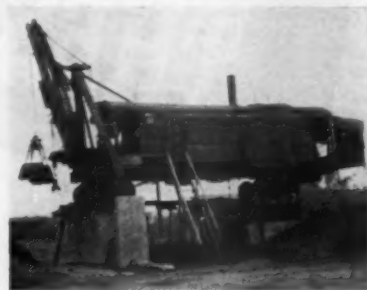
to be loaded will fill up to the bottom of the pipe and overflow at the top. When the overflow occurs, the loader closes the chute; the car itself is still not overloaded and no material spills to the ground.

For operations where weight of charge is estimated by filling to a

certain height, this arrangement will give consistent results. Pipe (A) can be attached to the car itself or to the loading chute or gate.

Use Steam Shovel in Emergency

PRIOR to the construction of a conveyor system for loading bins feeding the washing and screening plant, the J. Fred Smith Gravel Co., Dallas, Texas, put an old railroad type steam



Old steam shovel used as a temporary expedient in supplying washing plant with materials from stockpiles

shovel to practicable use. This shovel was used in the pit until a new haulage system from pit to plant was inaugurated. Running it up onto concrete piers next to the washing plant, it was used to load the plant from stockpiles and railroad cars with material received from the pit. Although the shovel only has a 180-deg. swing, it served the temporary purpose satisfactorily.

Save Conveyor Belts

By J. F. PRUYN

EXCESSIVE DAMAGE from ripped and burned conveyor belts can be avoided by the two simple arrangements used in a western operation.

To avoid burning from materials that escaped quenching, a simple arrangement of electronic tubes (CE-1) hung over the belt, and protected from dust and shock by a long glass tube, was installed. The tubes activate a relay that operates a valve to



Three steps in loading and transferring skip box onto truck: left to right; loaded box; box being drawn up over rolls by winch; skip box locked into position on truck by hook

turn quenching sprays on the hot material. Such an arrangement can be adjusted to quench spots of hot material with the minimum of water. For those operations where moisture content of conveyed materials is important, this apparatus would be very useful and cheap to install.

In the event that the material conveyed is always warm, the tubes would become too hot to function. To solve this problem, two concentric glass protecting tubes could be flooded with water or air to maintain the tubes at the right temperature.

This same plant ruined two \$5000 belts through freak accidents that tore more than half the belts before the conveyor was stopped. Since then, a series of arms that drag on the under side of the belt have been installed. When one of these arms spring up through a tear, a signal alarm bell rings and the conveyor is stopped. The dragging arms are arranged as a simple mechanical lever system that trips the alarm circuit when the arms spring up or are pushed down (a double precaution).

Conveyor Cleaner

IT IS THE CUSTOMARY PRACTICE in sand and gravel and many crushed stone operations to clean off material sticking to the conveyor belt, after passing the discharge point, by the use of a water spray. This problem of material clinging to belts is particularly troublesome with fine, damp sand. An objection to this method, however, is that the fine material washed off the belt eventually piles up and must be disposed of and the spray water creates a drainage problem.

C. Y. Garber, an official of Bunker Hill & Sullivan Mining & Concentrating Co., calls attention to an arrangement he devised to overcome this problem in *Engineering and Mining Journal*, which may be adapted to the rock products industries. As shown in the sketch, Mr. Garber sprays the



Above: Tractor pulling pipe on skid to loading stage. Below: Loading pipe onto trailer which has backed into pit. Note cable under pipe which is used to hold pipe securely with the aid of a winch

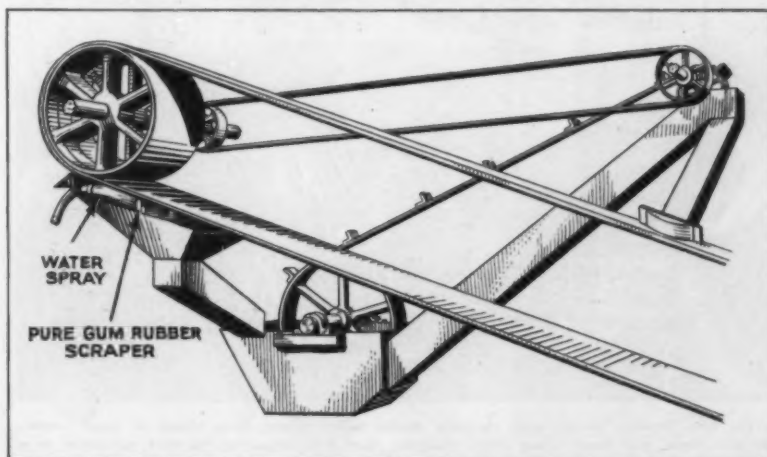
material clinging to the conveyor belt after passing the head pulley and then spouts it to a paddle drag which returns the solids to the conveyor, leaving only the water and fine material to be disposed of.

Tractor "Yards" Pipe

CONCRETE PIPE AND PRODUCTS CO., Inc., Richmond, Va., has a very convenient set-up for handling pipe from stock in the yard to trailer trucks for shipment to destination.

As shown in the illustration a pit was dug into slightly rising ground to minimize the grade that the loaded truck must pull up. It is just deep enough so that the floor of the trailer is at ground level when backed into the pit. Pit walls were constructed with concrete block.

Pipe are transported from storage to the loading stage on wooden skids pulled by a tractor, as shown in the illustration. They are then rolled manually on plank onto the trailer over a cable which is attached to a 5-ton winch at the forward end of the trailer. When the pipe are loaded and blocked into place, the cable is thrown over the top of the pipe and the free end attached to the winch. This winch is not equipped with power for pulling, but merely acts as a brake to hold the pipe in place and to unload from the trailer.



Water spray arrangement for cleaning conveyor belt with paddle drag to return solids to conveyor

NEW Machinery

Conveyor Brake

BARBER-GREENE Co., Aurora, Ill., has developed an improved band-type back stop which has a shoe acting directly on the brake drum. The



Differential band back stop on a conveyor

new back stop, available in 12-, 18-, and 24-in. diameter drum size, is said to be a very effective and trouble-free device in preventing loaded belt

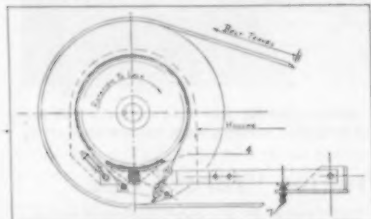


Diagram showing action of the differential back stop during normal forward motion and back run. Running forward, there is only slight pressure on drum of a portion of back stop weight resting on the drum. Adjustable bolt (7) determines drum pressure. When reverse motion occurs, the band becomes tight and shoe (4) is pulled up against drum

conveyors or bucket elevators from running backwards when, for any reason, the power is shut off.

Instead of the brake band taking all the torque required to hold the conveyor, the shoe takes an appreciable part of the load. When the differential acts and the band tightens, the shoe is pulled up against the drum with great force giving added friction. Less frictional resistance of the brake band itself is required.

Shovel Developments

THE OSGOOD Co., Marion, Ohio, has given a preview of postwar products which will be available, including a dozen models of shovels and draglines ranging in capacity from $\frac{3}{8}$ - to

2½-cu. yd. These models include a lightweight $\frac{3}{8}$ -cu. yd. shovel, crawler mounted; a medium weight 1-cu. yd. shovel; a slightly heavier unit of 1¾-cu. yd. capacity; a 2-cu. yd. machine to replace the Model 90; a new 2½-cu. yd. type 100 unit available in three models.

Concrete Block Yard Hoist

MILLARD R. WARREN, general superintendent of the Southern Cast Stone Co., Inc., Knoxville, Tenn., is now producing the Warren Yard Hoist to assist in yarding masonry units. The hoist, shown in an accompanying illustration, is fabricated of welded iron pipe and is mounted on rubber-tired wheels. Four jack screws permit the hoist to be elevated so that the wheels are free of the ground, to make the machine firm and secure in operation. A 20-ft. cantilever truss boom acts as a carriage for the air cylinder. The cylinder piston activates a movable clamp which grips the units to be moved; the other clamp is fixed. The piston-activated clamp moves against a spring when air is introduced into the cylinder, and rotates on a pivot so that introduction of air pushes the clamp firmly against the block. When air pressure is released, the spring returns the clamp to its original position. The boom swings in an arc of 180 deg.

Specifications including clamp capacity, air supply, unloading capacity, and shipping weight follow:

Clamp capacity is eight 3-in. block; six 4-in. block; four 6-in. block; three 8-in. block; two 12-in. block; all sizes in either the 12- or 16-in.

lengths. Special dogs are required for fractional units.

Air supply is provided by a ¼-in. air hose from compressor to machine; 100 lb. minimum air pressure for light weight block, Superrock, cinders, etc.; 130 lb. minimum air pressure for heavy weight block. Unloading 600 8- x 8- x 16-in. block per hour requires 3½ to 4-cu. ft. of air per minute, depending on operator.

Unloading capacity is 800 8- x 8- x 16-in. block per hour. One man has unloaded as high as 7500 8- x 8- x 16-in. block in 8 hours. Unloading capacity depends entirely upon operator.

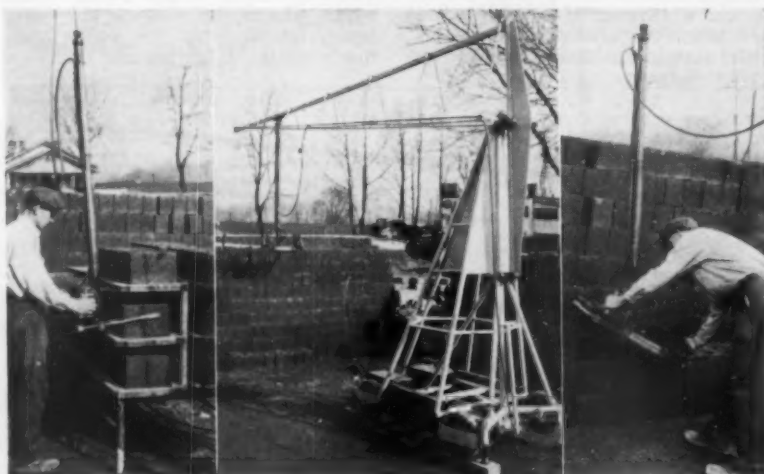
Splicing Wire Rope

AMERICAN CHAIN & CABLE Co., Inc., Bridgeport, Conn., has announced a new method for splicing wire rope into slings or various assemblies which is said to result in a neater and more



Wire rope splice which may be used with any standard fitting

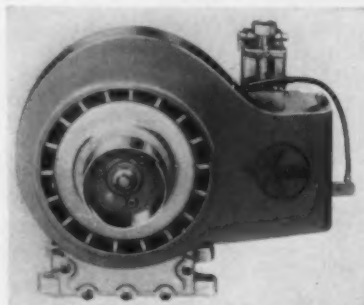
compact splice than possible by the hand method. The ACCO-LOC Safety Splice applies the load stress in direct line with the pull of the load and maintains equalization of stresses in all strands.



To the left: Showing air-operated clamping device which grasps three blocks at once; center, portable frame and boom, from which clamping device is supported, permits movement in a horizontal and vertical plane; right, stockpiling block from rack, showing the fixed arm side of clamping device

Air-Cooled Engine

KINNER MOTORS, INC., Glendale, Calif., has designed a 5-hp. all-purpose air-cooled engine which has some unusual features. The model AB-3 is a 4 cycle, L-head engine rated 5 hp., at 2600 r.p.m., but develops 6 hp., at 3250 r.p.m. The single

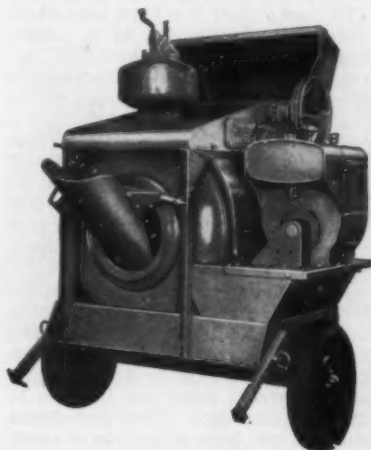


Light-weight all-purpose gasoline engine

cylinder is horizontal and detachable, making maintenance easier. Bore is 2 3/4 in., stroke 3 in., and displacement 17.8 cu. in. The use of aluminum alloy in the crankcase, piston, head, and crankcase and rear cover has reduced weight to a minimum.

Concrete Mixer

KWIK-Mix Co., Port Washington, Wis., has brought out a one-bag concrete mixer, 6-S Dandie, which is soon to be followed by new 16-S and 11-S models. The new mixer is welded throughout to reduce weight, and utilizes high strength steel. It is equipped with a selective skip shaker which does not engage until the skip is partially emptied and ready for shaking. A thorough mixing action is provided by combining buckets and blades inside the drum, and the tilted flow-line discharge chute is said to empty the drum faster. It is mounted on automotive type leaf springs and pneumatic tires. The 6-S mixes 6 cu. ft. of concrete plus 10



Mixer has convenient controls for high speed operation

percent, and complies with A.G.C. standards for this size which replaces the 5S and 7-S sizes.

Vibrating Bar Grizzly

NORDBERG MANUFACTURING CO., Milwaukee, Wis., has brought out its Symons vibrating bar grizzly for scalping service where clear spacings of 2 1/2 in. and larger are permissible. It is said that this vibrating grizzly is particularly effective for materials that are wet, sticky and gummy. This motion is such that the rock as it first falls on the bars quickly separates the smaller adhesive particles from the larger pieces. As the feed progresses toward the discharge end, these small sizes drop through the bar openings as the vibration gradually assumes a more horizontal straightline motion.

Bars are of heavy manganese steel, slightly diverging and tapered end to



Vibrating bar grizzly handles wet, sticky materials

end and top and bottom. The shape and angle of inclination of the bars and the positive, powerful vibration assures a non-clogging scalping action that permits large capacity. It is built in one size, 42 in. wide and a clear lengthwise opening of 5 ft.

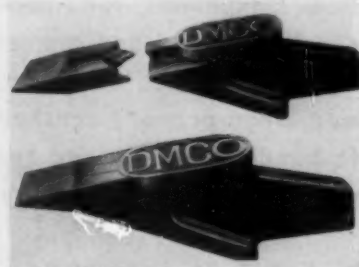
For Heavy Welding

GENERAL ELECTRIC Co., Schenectady, N. Y., has brought out a heavily covered arc-welding electrode for flat and horizontal fillet welding as well as for flat butt welding. Applications of this electrode include pressure vessels, heavy machine bases, and structural parts such as column plates, columns, roof trusses, beams, and girders where the thickness of the section permits.

Known as Type W-27, the new electrode has a high melting rate which results in increased production and higher speeds at the same welding current as other electrodes. The electrode operates on alternating current or direct current with either straight or reverse polarity. It is said to have a low spatter loss and easy slag removal and produces welds of excellent appearance.

Two-Piece Dipper Tooth

DANIELS-MURTAUGH Co., Cedar Rapids, Iowa, has designed a two-piece dipper tooth, the two parts being designated as the "Penetrator Point" and the "Weldapter." When the point becomes worn, it is rapidly



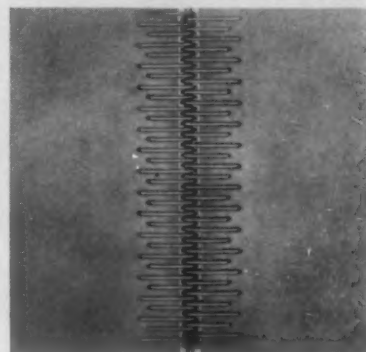
Showing separate parts of two-piece dipper tooth and assembled view

removed and a new point installed by simply slipping it on the Weldapter and tack-welding at several points along the side and across the end where the parts join. The welds hold the point in place only. The double-key supports, one lengthwise and one crosswise of both parts, take all the digging stresses upward and downward, as well as side thrusts and impact shocks. Points are of high quality heat-treated alloy steel forgings, and it is claimed that the Weldapter, not being subject to wear, will last indefinitely.

Wire Belt Hooks

THE BRISTOL Co., Waterbury, Conn., has announced a line of hinged-type wire belt hooks which are designed for joining all types of flat belting in sizes which will take care of belt up to 3/4-in. thick.

A new method of mounting the hooks in the spacer card makes it possible to leave the card in place in the lacing machine during the lacing operation. The hooks are thus held in accurate alignment until the hook points pierce the belt. It is not until after the lacing operation has been completed that the card is removed.



Hooks designed to enter belt in two rows with each opposite point passing into the belt in alternate rows

Crushing

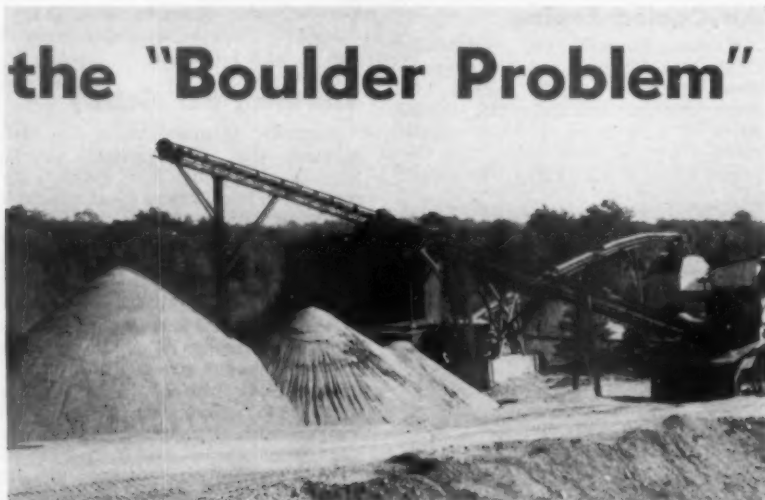
Eliminating the "Boulder Problem"

E. L. Dauphinais, Inc., producers of sand and gravel and ready mixed concrete, add large primary crusher to handle boulders and revamp plant for efficiency

By L. D. H. ANDERSON

Of more than average assistance to all types of construction work in the greater Worcester area has been the large production gravel plant and increased ready mixed concrete facilities of E. L. Dauphinais, Inc. Plant facilities are located in North Grafton, Mass., 5½ miles from the center of Worcester. Beginning operations as gravel producers in 1933, this company has had a constantly healthy growth since that time by paying extremely close attention to the quality of product and giving dependable service.

Starting with a modest size gravel plant, the company has added to and revamped its facilities, in addition to building large stock piles, so that any commercial gravel product and type or grade of concrete is readily available to its large list of customers. Most recent improvements include the addition of a larger primary crusher in order to avoid rejections at the truck unloading hopper be-



Sand stockpiling conveyor in foreground with storage bin directly behind; conveyor to concrete batching bins is back on opposite side of storage bin

cause of size. This hopper holds approximately 15 cu. yd. of material, adequate under present conditions to take up the slack or provide a cushion for any slightly irregular deliveries to the hopper. The entire plant is the design of the Anderson Engineering Co., Cambridge, Mass.

Crushing and Screening

The gravel bank, which covers approximately 28 acres, has a face from 45 to 50 ft., affording an ideal condition for excavating. About 70 percent of the deposit is gravel over ¼-in. Excavating is done with a 1-cu. yd. Model 55 Lorain gasoline engine-powered shovel, and hauling to the hopper is done by A. C. Mack trucks, with a third of the same type truck being used for stockpiling from bins when needed.

In the flow sheet beginning at the

truck hopper is a 30-in. by 5½-ft. reciprocating feeder; a size selected to provide an extra large discharge opening to avoid restriction of the flow of material whenever a few 10-in. to 15-in. boulders are grouped together. The primary scalping is with a ring grizzly. Oversize is rejected to a 14- x 28-in. New England jaw crusher while the undersize bypasses the jaw crusher onto a 24-in. belt conveyor, 99-ft. 6-in. centers. The 30-in. feeder is driven by a V-belt drive from a 3-hp. Louis Allis motor through a set of spur gears. The ring grizzly is driven by a 2-hp. Master Gear Motor and roller chain drive. The jaw crusher has a V-flat drive from a 50-hp. Continental motor.

Delivery of the undersize from the grizzly to a point below the discharge of the jaw crusher cushions the belt from the crushed material to provide longer service. This primary conveyor includes anti-friction bearings on both the troughing and return idlers. The frame itself is a truss type 24 in. deep of such strength as to permit approximately 40-ft. spacings between the bents. A 15-hp. Fairbanks-Morse motor on this conveyor drives to the head shaft through a double reduction of roller chain. The whole head end and drive is self-contained. Roller chains operate in a bath of oil in water-proof casings. The discharge from the primary conveyor is onto a 3- x 8-ft. two-deck Kennedy vibrating screen.

At this location is a feature not ordinarily employed in gravel plants in New England. Facility is provided for removing part of the sand when desired, or the sand and marketable sizes of gravel stone can both go to the main conveyor. When some sand is taken out here, it goes to a small hopper from which it can be loaded directly in trucks, or can be deposited



Showing sand and gravel deposit characteristics. Note two levels from which material has been excavated by shovels

onto an 18-in. conveyor, 120-ft. centers, for stockpiling. Discharge from this conveyor is over the head pulley, or at two intermediate points, by plowing from the belt. This grade of sand is sold extensively for covering bituminous applications and slippery roads.

Oversize from the upper deck of this scalping screen goes to a 36-in. Gyrasphere crusher, usually set to produce minus $1\frac{1}{4}$ - or minus 1-in. material. The drive on this crusher is through V belts from a 60-hp. Louis Allis motor running at 1160 r.p.m. full load speed. This product is carried on an 18-in. belt conveyor, 66-ft. 6-in. centers, to afford a closed circuit.

All material deposited on the 24-in. main belt conveyor, 82-ft. 1-in. centers, is sluiced to a 57-in. by 25-ft. revolving screen largely built by the owners. It is jacketed for sand and two sizes of stone. This drive is from a 20-hp., 900 r.p.m. motor through a speed reducer.

Soft Stone Eliminator

Each individual size of stone is put through a soft stone eliminator which provides material acceptable to all engineers and architects. Water and undesirable material are sluiced off and the stone goes to pockets in a bin holding approximately 400 tons of all sizes. The sand is dewatered in triple screw units designed and assembled by the owners. Any size of material in the bin can be drawn off through side bin gates to another steel truss frame belt conveyor which carries to a Butler steel batching bin. All conveyors are of Anderson Engineering Co. design.

For economy in stockpiling washed sand, it can be plowed from this conveyor to ground storage underneath. Reclaiming this sand is done by either a $\frac{3}{4}$ -cu. yd. Lorain Model 40A gasoline engine powered shovel, which also is used for reloading gravel, or by a Barber-Greene bucket loader.

In addition to the concrete batch-



General view of lower end of plant with covered field hopper to the left

ing bin located at the gravel plant site, the company also has two others, one of which is at Southbridge, Mass., approximately 22 miles distant, and another within the City of Worcester, located at the plant of the American Steel & Wire Co., which was set up about three years ago when one entirely new steel mill was constructed.

The company attributes its unusual success to service. This is available whenever needed and is helped considerably by a long practice of maintaining machinery in first class operating condition at all times. Many large construction projects have been serviced in the metropolitan Worcester area. The gravel and batching plants have been busy since "before Pearl Harbor" and are still producing at top capacity.

The company is owned by A. J. Dauphinais, and his sons Emil L. Armond A., and Albert A. Dauphinais.

Veto Gravel Plant

BLUE DIAMOND CORPORATION's plan to erect a crushed stone and gravel plant south of Strathern street, be-

tween Tujunga and Fair avenues in the Roscoe district, had a set back when Mayor Fletcher Bowron of Los Angeles, Calif., vetoed a measure passed by the city council which would have permitted erection of the plant.

"Steel Feeds the Soil"

TENNESSEE COAL, IRON & RAILROAD Co., subsidiary of United States Steel Corporation, in a recent advertisement entitled, "Steel feeds the soil that feeds the nation," pointed out that basic slag, containing several important minerals, including phosphorous and lime, had been recognized by many southern farmers as an excellent fertilizer in restoring the fertility of depleted soils.

English Barytes Reserves

PRODUCTION of barytes in West Cumberland, England, has been increased from insignificant amounts to about 25,000 tons annually. A simple gravity concentration plant produces high-grade barytes with an average barium sulfate content of 96 percent.



Left: View of plant from truck unloading hopper looking up primary conveyor toward small dry sand hopper; also there may be seen return conveyor, main conveyor to top of bin, and sand stockpiling conveyor in the background. Right: Covered conveyor inclining up to concrete batching bin with washed sand stockpile below. Provision has been made for delivering to this conveyor by trucks hauling from gravel storage over ramp to truck hopper and short conveyor in foreground



Typical lime plant in Argentina has vertical kilns with masonry walls

Expanding demands from construction, chemical and agricultural industries will create big market for lime

By JORGE BOISO*

ARGENTINE Lime Industry Grows with the Nation

FROM a technical point of view, the lime industry in Argentina has not attained its possibilities. Many of the kilns are very old and quite primitive. They are simple vertical kilns constructed of stone masonry with fire brick linings, and there are no rotary kilns for the manufacture of lime in the entire country.

Kilns, hydrating plants and grinding equipment of the more modern type are arranged as shown in the illustration, comprising hydrator, tube mill, air separator, cyclone and filter. Machinery has been largely imported from England, United States, Germany and Sweden, but some of the equipment is now being made in Argentina. In the postwar era, the Argentine market will not depend on foreign machinery if the design does not offer greater efficiency and more safety features and it must be sold at reasonable prices. All the present lime plants are using very simple packing machinery without automatic weight control, only the volume of the paper valve bags of two, three and four folds determining the weight of 40 kgs. Quick lime is transported in bulk.

Present lime production in the Argentine Republic is about 350,000 tons, about 35 percent of the portland cement production. During the past 10 years this amount has kept about the same level. About 85 percent of the lime production has been used for construction, and the remainder has been absorbed by the tannery, sugar, and chemical industries. Only a small quantity is used in agriculture as the soil generally is not acid.

The first lime kilns were erected by the Spanish colonizers on the slopes of the Paraná River where

lime pits were operated for three centuries supplying Buenos Aires and later certain inland cities. The Lone Star Corporation's newest cement plant in Argentina, the Paraná mill, is located near the first lime pits. At the end of the nineteenth century, the lime pits in this area became of less importance as plants at other locations were beginning to produce lime of better quality and also had a competitive freight advantage. With the decline of the Paraná lime industry, a new center at Córdoba came into prominence with a good local market, and better transportation facilities widened its sales area to include Rosario and Buenos Aires. A non-hydraulic lime is produced of very good quality, as white as ivory and with a yield of 2.7:1 in volume.

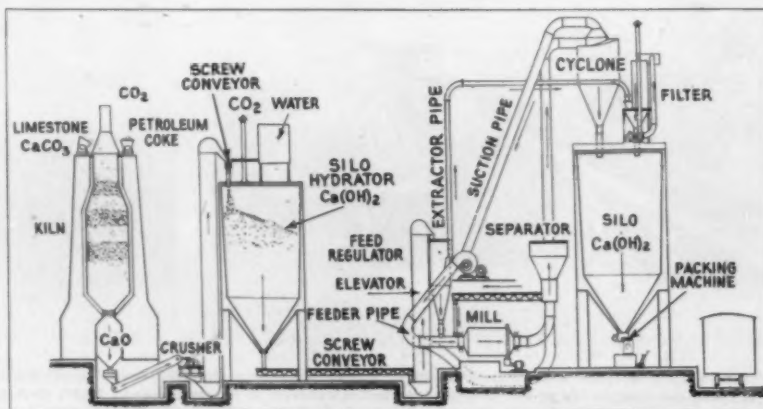
Another lime manufacturing area has grown up in Buenos Aires province. The product is known as Azul lime, from the name of the town near the quarries, but the real geographic center of the industry is at Olavarría. The new product may be classified as hydraulic lime.

Other lime centers have been developed, principally at San Juan, San Luis, Santiago del Estero, but these plants in most cases only supply the local market.

Must Educate Market to Use Hydrated Lime

Fifty percent of the entire production comprises hydraulic lime from the Province of Buenos Aires, and 36 percent is non-hydraulic from the Córdoba district. Latest available figures on production covering 1942 show Buenos Aires with 171,799 metric tons, Córdoba with 124,553 metric tons, and San Juan with 13,251 metric tons; other relatively small production from twelve districts supplying only 34,597 metric tons make up the total of 344,200 metric tons. These figures cover only lime transported by railway, the remaining 6000 metric tons estimated to represent lime moved by other means, adding to a total of about 350,000 metric tons.

Ground hydrated lime did not



Cross section of vertical lime kiln plant equipped to grind hydrated lime

*Engineer and Technical Director, Compañía Industrial Nortena and Loma Negra, S.A., Buenos Aires, Argentina.

LIME

come into the picture until about 20 years ago as up until that time only quick lime was marketed. This industry has developed particularly in the Province of Buenos Aires with hydraulic lime, and to a smaller extent in Córdoba, although there are a few small mills in the north.

When ground hydrated lime was produced, the trade had to be educated to the use of this product as contractors had been accustomed to quick lime. Technical booklets and demonstrations were used for this purpose. In the large cities today nearly all contractors now use ground hydrated lime and the contractors in inland cities are slowly replacing quick with hydrated lime.

Another problem of competition developed. The ground hydrated lime permitted mixtures with some cheap clays which had less strength than normal hydraulic lime but also more workability. For this reason some mills in towns far from the lime quarries buy quick lime and grind lime mixed with earth. It is a cheap product but it brings about price wars at the risk of quality.

The lack of suitable specifications has brought about this situation, but standard specifications have been set up by the Laboratory of Testing Materials of the City of Buenos Aires and also by the Province of Buenos Aires. The standards I.R.A.M., corresponding to A.S.T.M., now being formulated by a special committee, will provide a national standard for hydraulic lime, taking as a base the standard tests of A.S.T.M.

The following analysis shows the typical chemical composition of two kinds of hydraulic ground, hydrated lime compared with a mixed lime:

	A	B	C
H ₂ O (105 deg. C.).....	0.56	0.56	.....
CO ₂	1.79	6.38	Less 5%
CaO	69.30	47.88	.....
MgO	0.85	0.81	Less 3%
SiO ₂ (soluble)	11.30	9.00	} More 10%
Al ₂ O ₃	1.60	1.43	
Fe ₂ O ₃	0.75	0.65	
Insoluble	0.40	22.20	Less 2%
SO ₂	0.11	0.11	.....
CaO (active)	67.78	40.50	More 60%
Strength (pressure 28 days).....	92 kg./cm ²	37 kg./cm ²	More 40 kg./cm ²

(A) A good quality lime. (B) A mixed lime. (C) Municipal standard.

totals 258,439 tons of quick lime, 146,757 tons of hydraulic lime, and 42,445 tons of hydrated lime, having a combined value of \$8,917,190 in Argentine currency.

Gypsum Production Declines

PRODUCTION of crude and calcined gypsum continued a downward trend which started since Pearl Harbor, total output in 1944 being, respectively, 4 and 8 percent less than in 1943, according to the Bureau of Mines. In comparison with the average output in the five-year period, 1939-1943, crude gypsum production was down 7 percent and calcined gypsum 25 percent in 1944. Although construction in 1944 was much less than during 1943, shifts in the gypsum use pattern and substitution of gypsum board for scarce one-inch lumber enabled the industry as a whole to operate at near 1943 levels.

Sales of uncalcined gypsum for cement retarder dropped 32 percent reflecting the decline in cement production. Industrial sales of calcined gypsum for pattern-making and molds have expanded. Sales of base plaster in 1944 were about one-third

and of lath about one-half of pre-war volumes. Despite construction curtailment, wallboard sales were well maintained in 1944, in fact, considerably higher than pre-war. Comparative figures for 1943 and 1944 are shown below.

Agricultural Gypsum

MOST IMPORTANT SOURCES of agricultural gypsum in California are found along the western edge of the San Joaquin Valley. While limited use was made of gypsum as an agricultural mineral in former years, recent usage has shown a large increase. In 1934 only 7914 tons were sold while in 1943, this figure leaped to 300,980 tons. This is due to the fact that it is only in recent years has gypsum been used for treatment of black alkali land and for flocculating heavy soils to increase their permeability to water.

Install Dust Collector

THE WARNER Co., Philadelphia, Penn., has announced that a dust collector will be installed on the last of the three rotary kilns now in operation at the Bellefonte lime plant as soon as wartime conditions permit.

GYPSUM AND GYPSUM PRODUCTS IN THE UNITED STATES—
FOURTH QUARTER, 1944

	January-December— 1944 (Quantity) Short Tons	1943 (Quantity) Short Tons	Percent Change from 1943
Crude gypsum mined ¹	3,753,911	3,918,559	—4
Calcined gypsum produced ¹	2,364,727	2,563,819	—8
Gypsum products sold or used ² :			
Uncalcined uses:			
Portland-cement retarder	579,854	869,914	—33
Agricultural gypsum	469,986	376,864	+25
Fillers and unclassified	14,240	15,942	—11
Industrial uses:			
Plate-glass and terra-cotta	25,300	20,000	+27
Pottery plasters	31,970	34,782	—8
Dental and orthopedic	12,371	14,760	—16
Other industrial uses	130,816	93,944	+39
Building uses:			
Plasters:			
Base-coat	520,715 ³	527,684	—1
Sanded	75,761	71,567	+6
To mixing plants	19,034	24,906	—24
Gauging and molding	78,088 ³	73,840	+6
Prepared finishes	6,108	4,402	+39
Insulating and roof-deck	27,466	44,642	—33
Other building plasters	13,661	13,410	+2
Keene's cement	12,421	8,019	+55
	M. sq. ft.	M. sq. ft.	
Lath	624,067	630,613	—1
Wallboard	1,211,825	1,241,991	—2
Sheathing	109,246	232,784	—53
Laminated board ⁴	175,133	203,827	—14
Tile	14,879	11,637	+28

¹Excludes by-product gypsum. ²Includes by-product gypsum. ³Revised figure. ⁴Reported as area of component board and not of finished product.

Future Markets

If the market for lime should develop in proportion to the increase in construction, there should be a bright future for this product. Present private and public construction volume amounts annually to about \$200,000,000 with lime sales estimated at about \$4,000,000 or about two percent of the total. The housing program now being studied by national authorities will total \$500,000,000 alone. Up to the present, Argentine soil under cultivation has not required lime to neutralize acidity, but in the future much more lime will have to be used for this purpose.

Estimated probable lime production annually in the various provinces and territories of Argentina is as follows: Buenos Aires, 250,000 tons; Córdoba, 250,000 tons; Corrientes, 2000 tons; Entre Rios, 20,000 tons; Jujuy, 5000 tons; Mendoza, 5000 tons; Salta, 10,000 tons; San Juan, 20,000 tons; San Luis, 15,000 tons; Santiago del Estero, 12,000 tons; Tucumán, 3000 tons; Chubut, 2000 tons; Río Negro, 2000 tons; a total capacity of 596,000 tons. Present production

Agstone

CONVERTING STONE PLANT FOR FINER CRUSHING

Collinson Brothers add more fine crushing capacity to meet demands for agricultural limestone

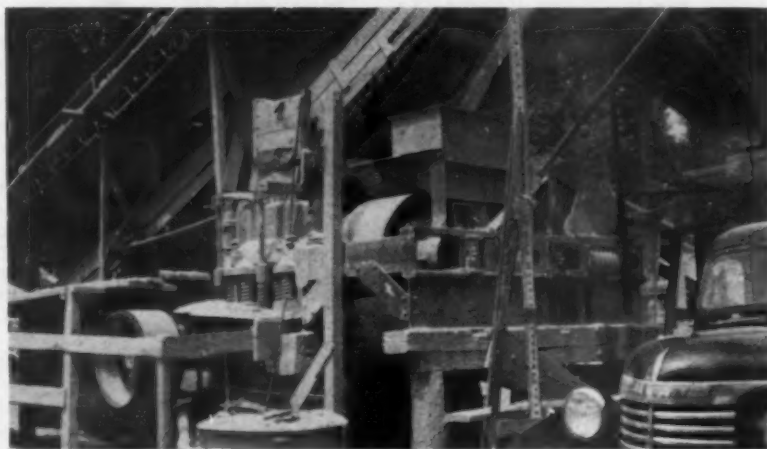
ILLUSTRATED herewith is a typical small limestone plant, owned and operated by the Collinson brothers near Milan, Ill. Although the majority of this plant's production of 500 tons per day was road stone, increasing demands for agricultural limestone have necessitated changes in production methods to meet these demands. In anticipation of larger sales of agstone in the future, this plant added a 22- x 40-in. Austin-Western roll crusher early in 1944.

The plant operation is typical of limestone plants with the same capacity. A $\frac{3}{4}$ -cu. yd. Bucyrus-Erie shovel loads three 2½-ton International trucks, which transport the stone to an 18- x 38-in. Austin-Western jaw crusher. A 24-in. belt conveyor transports the stone to a 4- x 8-ft. triple-deck Simplicity screen, from which it is fed to either a No. 3 Symons coarse bowl crusher or to the roll crusher by means of metal chutes. After recrushing, the stone is returned to the screen where it is sized for charging storage bins. Power for the primary crusher is provided by an International gasoline engine, while individual Caterpillar Diesel engines provide power for the other crushers. The International engine also provides power for the screen and the belt conveyors.

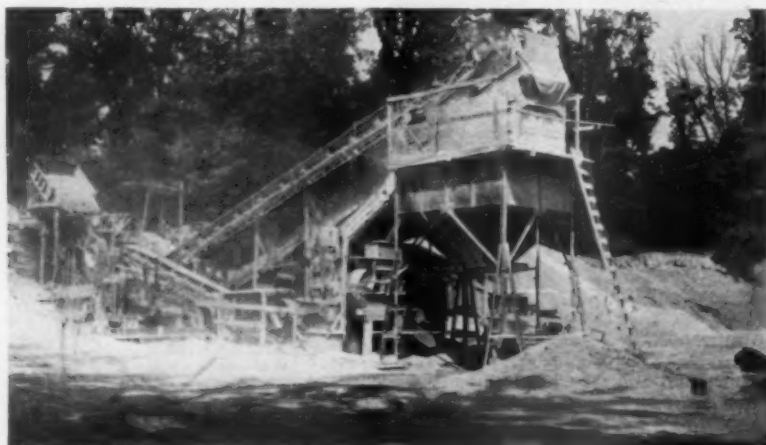
This plant is owned by E. A. Collinson, J. V. Collinson and M. D. Collinson.



Left to right: Chas. Collinson, weigh master; Jos. McCormick, assistant plant manager; J. V. Collinson, partner; Carl Brittingham, plant manager; and E. A. Collinson, partner



Close-up of secondary crushers, cone crusher to the left and roll crusher to the right



Left: Primary jaw crusher and long conveyor inclining up to screens, bins and secondary crushers below. Right: Overall view of plant

VICTORY IN EUROPE

What Effect Will It Have on the Rock Products Industry?

Industry leaders anticipate gradual improvement until V-J Day when many restrictions will be dropped. Labor shortage to hold back rapid conversion

UNTIL cut-backs in war orders and the return of discharged veterans provide sufficient labor, it will not be possible for the rock products industries to step up production very materially. Lack of labor and continuance of war-time restrictions were listed almost universally as the principal bottle-necks to resumption of normal production by industry leaders who responded to a telegram requesting their opinion as to the early effect of the end of the European phase of the war. Telegrams were received from every segment of the industry and from all sections of the country.

The War Manpower Commission has taken steps to ease labor restrictions in certain areas where war orders have been cut back or cancelled, and it is believed that materials will be made available for reconversion by the War Production Board where these demands will not hinder supply to carry on the war against the Japs. Many feel, however, that the governmental authorities have been caught unprepared for the problems of V-E Day and have not moved quickly enough to remove unwarranted restrictions. It is indicated from the replies that within possibly 90 days or before September 1, restrictions will be eased sufficiently, with an increase in labor supply, so that a considerable volume of construction work will be under way, and with the coming of V-J Day activities will be well advanced. Very few reconversion problems are expected in the rock products industries as no extensive plant changes will be required, but many plant improvement programs are under consideration.

Sand and Gravel

In the sand and gravel industry much optimism is expressed as to the long-time pull but restrictions as to labor and material are holding back immediate improvement. Comments are as follows:

OTTO S. CONRADES of the St. Louis Material and Supply Co., St. Louis, Mo., reports, "The earliest effect of the European victory on our company's operation and sales and that of the industry nationally will of course depend on the degree of relaxation of governmental restrictions affecting construction. Much potential construction of homes and building of highways is in the completed plan stage in this area. Within 60 days after approval to proceed, many of these projects will get under way, however, the momentum may easily become dependent upon available manpower of the type utilized in the construction industry. With relaxation of restrictions and plenty of available manpower, production volume of sand and gravel should rise within a year to the peak of any one of our prewar years and a good yearly average should be maintained for at least five years thereafter."

F. D. COPPOCK of American Aggregates Corporation, Greenville, Ohio, believes that moderate transitional improvements in the business can be expected following V-E Day, but he points out "there can be no substantial nor spectacular increase until Japan has been completely whipped and our people have had a year or two to become oriented to changed world conditions. Only then will we and our industry go forward once again with the courage and confidence of American traditions."

H. N. SNYDER of Buffalo Slag Co., Inc., Buffalo, N. Y., replies, "I do not expect early or immediate improvement to aggregate business in this area due to end of European war. Some industrial building and heavy maintenance will get approval but no great volume is anticipated until labor is available. This area continues to be a critical labor area."

The Zanesville Gravel Co., Dresden, Ohio, wires, "Removal of ceiling prices and wage control will give our commercial lungs more healthy breathing space. Plant cost per ton



has advanced 50 percent since 1940. The productivity and efficiency of workers is at its lowest ebb; absenteeism and walking off the job without notice are multiplying; irresponsibility is becoming general. We will have a better country when we have people seeking work and business seeking orders on a competitive basis of quality and service."

PAUL BIRD of the Boston Sand and Gravel Co., Boston, Mass., expresses the view that in New England the effect of V-E Day will be only moderate and resumption of construction will be gradual. "At first the simpler sort of jobs, such as road work, will start, but we do not look for any large amount of work until 1946."

VICTORY IN EUROPE

There is much contemplated work in connection with airport developments, but we do not look for anything in this line to get under way immediately."

GARVIN PELSUE of Metropolitan Sand and Gravel Co., Port Washington, N. Y., believes that victory in Europe has caught the government unprepared for orderly industrial reconversion. "This may place more emphasis on public work construction as a relief measure for possible excessive unemployment," he believes, "and thus bring producers in areas where public works plans are ready to face a greater demand than available transportation facilities will be able to bear."

Highways Wearing Out

V. O. JOHNSTON of the Lincoln Sand and Gravel Co., Lincoln, Ill., is of the opinion that there will be an improvement in the labor supply, not only due to the return of veterans seeking jobs but the release of workers in war plants. He said, "I believe we can expect an early increase in the amount of both private and public construction. Our highways are all but worn out and they must be prepared for the great acceleration in travel as well as a means of employing war labor."

PAUL F. JAHNCKE of Jahncke Service, Inc., New Orleans, La., advises, "Railroads will hold off improvements for about six months. Highway department has prepared plans for extensive additions, but believe nothing important will be undertaken until federal government participates. Road building probably will be held in abeyance to combat any postwar slump that develops. Until V-J Day anticipate no stimulus to our business from this source, but there will be some residential building as soon as restrictions are lifted but plant output will not be absorbed from this source. I believe direct restrictions on business, such as price ceilings, W. P. B., etc., will be relaxed very slowly; consequently anticipate considerable inactivity and operational losses during transitional period."

T. E. McGRATH of McGrath Sand and Gravel Co., Lincoln, Ill., expresses the view, "There is every indication of an immediate improvement in the labor situation, which has been growing increasingly more serious since 1942, and a relaxation of present restrictions covering the purchase of new plant machinery and equipment will improve plant operations immeasurably. The serious transportation situation that existed in recent months undoubtedly will be relieved soon. There will be an increase in the demand for our products to supply civilian needs as soon as government reconversion plans get under way. The industry will respond quickly to relaxation of

present restrictions as it will not be confronted with any major problems of reconversion."

J. RUTLEDGE HILL of Gifford-Hill & Co., Inc., Dallas, Texas, reports, "Immediate effect of European victory has intensified demand for railroad ballast, concrete aggregates for building projects, highway widening and many other improvements. Our plants are all running full blast and there is no sign of any slackening off. Relaxation of restrictions will have a good effect locally as well as nationally; the earlier we get rid of all restrictions the better off everybody will be."

A. P. CALDWELL of Columbus Gravel Co., Columbus, Miss., reports that war plants have absorbed local labor and small building jobs and housing repairs have only resulted in a normal spring increase in sand and gravel business; large jobs are waiting on W.P.B. and W.M.C. to get their houses in order. There also is a definite lack of a tax program in Washington. He advises, "Several plants in territory not operating; those operating beginning slowly on postwar remodeling, several adding concrete products machinery. The main drawback now is labor and labor policies."

ANDERSON SAND AND GRAVEL Co., Saginaw, Mich., expresses the view that indications are very little improvement will be felt for at least six months or until manufacturing of materials for construction has progressed farther, particularly lumber.

JOHN PRINCE of Stewart Sand and Material Co., Kansas City, Mo., comments, "Actual labor shortages have exercised more effective control over volume of production, good maintenance and cost, including wages, than have regulation. V-E Day should bring psychological improvement but actual increase in labor supply may take many months. I do not look for early removal of wage stabilization control by W.L.B. or Wage and Hour division nor early removal of price control through O.P.A. Subject to manpower limitations, civilian demand should gradually replace war demands for our products but do not expect maximum demand before next year. Some replacements will be more readily available now but motor equipment, including trucks, cranes and shovels, may not be readily available before fourth quarter."

CHARLES WARNER of The Warner Co., Philadelphia, Penn., does not expect V-E Day to have any marked effect on the business for the balance of the year. "Chemical and agricultural lime products," he said, "should continue in strong demand for a considerable time. Resumption of construction activity will be slow and not call for substantial delivery increases until next year on account of delays in securing releases from

Washington and usual time lag of final authorization of projects and actual delivery of building material."

BRUCE S. CAMPBELL of Harry T. Campbell Sons Co., Towson, Md., advises a very tight labor situation has resulted from the draft taking important men with large families. "There is a question," he said, "that business will ever be able to get back on an even keel while W.L.B., W.M.C., O.P.A. and other alphabetical agencies are in existence."

E. J. GOODPASTOR of Pacific Coast Aggregates, Inc., San Francisco, Calif., believes "the European victory will bring about a flow of aggregates into civilian construction, street and highway improvements in large volume, which will be more generously spread than under the defense program, resulting in profitable operations in all areas. The West Coast probably is an exception as much defense work in this area is still under way and projected, though a similar situation may result here with the conclusion of far-eastern troubles." Mr. Goodpastor looks for considerable new plant construction, largely replacing old plants, and priorities sufficiently eased to enable this work to start soon.

CLAUDE L. CLARK of the Ohio Sand and Gravel Association and Ohio Ready Mixed Concrete Association reports that V-E Day has acted as a stimulating agent for appropriations of revenues for postwar activities by the Ohio legislature which is still in session. The sand and gravel industry is in need of early price relief before returning to full production. In some Ohio localities, a labor shortage still prevails, however, most of the shortage is for unskilled and lower price labor.

Gypsum

Speaking for the gypsum industry, M. H. BAKER of the National Gypsum Co., said, "Fortunately we have no reconversion that will require new machinery, and the principal problems which our plants have are shortage of labor, paper and steel. The recent victory in Europe will result in an early release of manpower and critical materials which should, by midsummer, permit sufficient labor to operate to capacity. Additional paper has been allocated to wall-board production for the third quarter and steel sheets in sufficient quantity for starting up our metal lath plant during the third quarter. In another six months we expect enough of everything for full capacity operation."

Cement

As may be expected the cement industry does not anticipate as early a revival of full scale operations as the aggregates industries. The head of one of the largest cement companies

VICTORY IN EUROPE

reports "the relaxation of restrictions under W.P.B. L-41 so far are slight and other relaxations are not yet sufficiently known to measure effects on volume of construction and cement demand."

R. D. RAFF, president of Diamond Portland Cement Co., Canton, Ohio, believes that European victory will have very slight immediate effect on cement shipments, principally due to shortage of manpower in the construction industry, and cement plant operations therefore will continue light for the remainder of 1945.

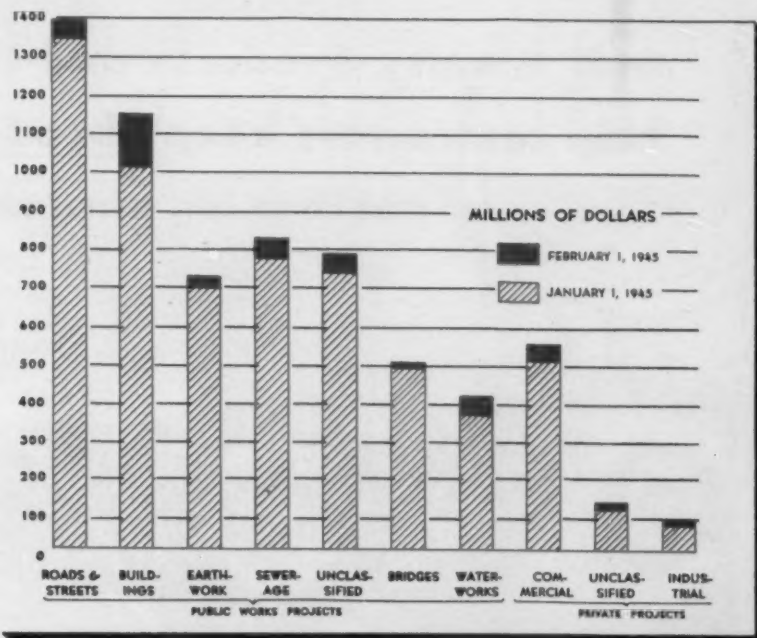
CHARLES HORNER, president of Kosmos Portland Cement Co., Louisville, Ky., does not expect any decided improvement in the rate of construction this year locally or nationally, and no difficulty is anticipated in plant operation to meet demand.

WM. WALLACE MEIN, president of Calaveras Cement Co., San Francisco, Calif., expresses the view that the European victory should release men and materials for deferred maintenance in cement plants, thus improving operating conditions. "Reconversion presents no problem to the cement industry," he said. "At the close of the last world war, President Wilson abolished war bureau agencies some of which thought they were essential to peace economy, but the country later saw the wisdom of the President's action. President Truman has consolidated some agencies which is a hopeful sign. Postwar demand for cement is encouraging as there is a great need for new highways, homes, air fields, maintenance work, etc."

E. D. HILL, president of Louisville Cement Co., Louisville, Ky., reported that the effect on his company's business of relaxation of restrictions depends largely on the extent to which labor is made available. "Indications," he said, "are that all of our plants will run as near to capacity during the next 90 days as we have labor to man them. While there is still a shortage of lumber, we feel dealers this year will have a good year, and when the dealers are busy so are we. Cement manufacturers have had their slack or reconversion period during the past 12 months, and we do not contemplate any extended lull in the building industry when restrictions are removed."

Crushed Stone

Nearly all stone companies are now busy, and could handle more business if labor was available. O. M. STULL of Liberty Limestone Corporation, Buchanan, Va., states, "I do not believe the end of the European war will make any material change in our business during the balance of this year. Some relief from the labor shortage will be experienced by September through release of labor in war plants and partial demobiliza-



Postwar construction plans under way by type of project. Data prepared by the American Society of Civil Engineers and the Committee on Postwar Construction

tion. Believe we will see considerable change toward production of civilian goods by the end of current year, but no chance for reduction of corporation taxes this year or next."

D. L. WILLIAMS of Virginia Limestone Co., Ripplemead, Va., reported that "locally there will be no immediate or early effect on our business for there is no quick prospect of alleviating a critical manpower situation." This situation has been accentuated, he pointed out, by the construction of a large rocket powder addition to a nearby ordnance plant which will keep all quarries operating full capacity. He does not see early prospects of a large scale relaxation of materials and manpower regulations. He expects a good demand in this area as present housing and highway construction has been severely curtailed.

S. P. MOORE of Concrete Materials and Construction Co., Cedar Rapids, Iowa, said, "We must win in the Pacific. Should restrictions on equipment and manpower be relaxed, our business locally and I believe nationally would increase rapidly as it offers an opportunity for reemployment. Road construction, surfacing of township and county roads, can proceed with minimum plans, and if maintenance supplies are made available and manpower referred to our industry, we can proceed rapidly."

SERVTEX MATERIALS Co., New Braunfels, Texas, believes that there will be a dull period, beginning soon and lasting a few months at least, as war plants using our materials will close

down faster than old outlets will be revived and new connections made. If restrictions are sufficiently relaxed, the company plans to further mechanize operation immediately to improve quality. This will be done to increase production per man-hour and at a lower unit cost. Labor thereby made available will be used in other operations which have been dormant for the last 18 months.

H. E. RODES of Franklin Limestone Co., Nashville, Tenn., is of the opinion that the European victory should shortly improve the labor shortage to some extent. "Relaxation of restrictions should come gradually, and only be discontinued when normal conditions have been restored," he said.

T. C. COOKE of Lynn Sand & Stone Co., Lynn, Mass., reports that "some industries and certain companies will feel the trend toward normalcy in the near future, but not the crushed stone industry nor this particular company. We believe that the road program will not start until there is definite unemployment, and then only where there are men looking for work. There possibly will not be any widespread unemployment until the war is all over, and hence very little road work outside of maintenance, but when the Japs are licked, keep your eye on our industry; we are going to do big things."

GEO. D. LOTT of Palmetto Quarries Co., Columbia, S. C., believes that a transition period into much needed civilian construction is now imminent. "Relaxation of controlled con-

(Continued on page 94)

**Gulf Quality Products and Fine Service
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on another big airport job!**



Two views of work in progress on Wood County airport, near Parkersburg, West Virginia, where Ralph Myers Construction Company of Salem, Indiana, and Western Contracting Company of Sioux City, Iowa, are moving 27,000 yards per day to keep well ahead of schedule.



RALPH MYERS Construction Company and Western Contracting Company are pushing equipment to the limit twenty hours a day to complete the airport project pictured above well ahead of schedule. Gulf quality lubricants and fuels help keep all this equipment on the job and working at top efficiency. These contractors know from experience that it's good profit insurance to specify Gulf products!

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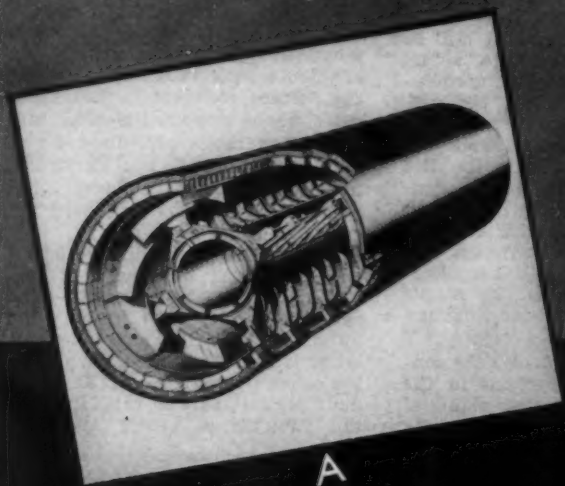
help them beat contract schedules. For proper lubrication and efficient fuel performance result in less time out for their equipment, longer life, and less expense for maintenance.

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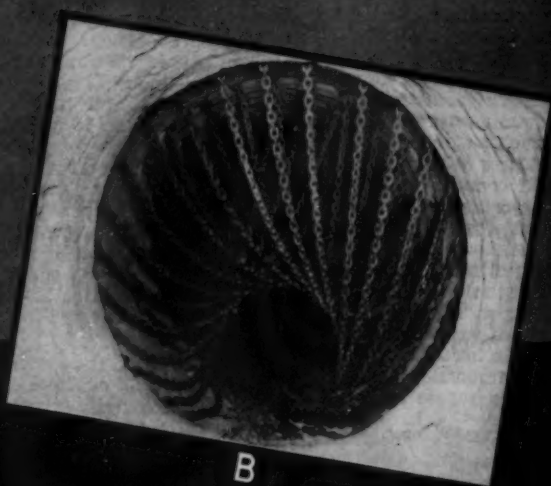


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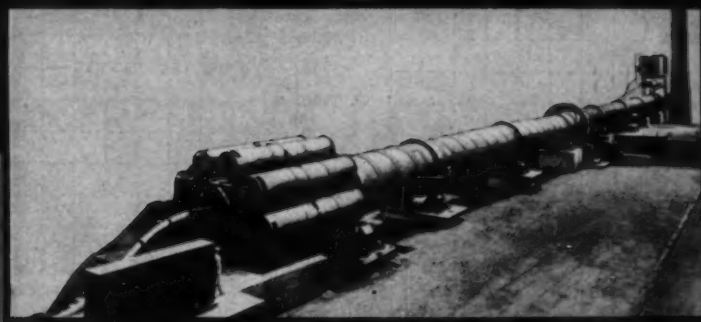


A



B

C



A
Heat
Exchangers
for
Dry Kilns

B
Chain
Systems
for
Wet Kilns

C
Unax Cooler Integral
with Rotary Kiln

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NEW YORK, N. Y.

Designing Concrete Mixes

Part I: Operations preliminary to design for quality

By R. E. ROBB*

DESIGN of concrete mixes is a scientific problem based on certain well defined laws. These were outlined in general in the preceding article of this series. This article, and those immediately following, will attempt to detail the steps which must be taken in accordance with those laws in designing concrete mixes to meet requirements for strength, durability, impermeability, etc., and, at the same time, secure maximum economy. These two requirements, quality and economy, while interrelated are nevertheless approached from different angles, and are subject to different laws. Hence they will be considered independently.

Since the strength depends primarily upon the cement/water ratio, so long as workable mixes are used, quite wide latitude may be exercised in the proportions of the various sizes of aggregate used in preparing

test batches, at least for preliminary studies. These proportions should, however, be reasonably close to the proportions which ordinarily will be used. Whenever possible, actual batches using regular weighing equipment and mixers should be used. However, it will often be necessary, especially for preliminary studies on construction work, to make the first set of test cylinders before the regular equipment is set up. This may also be the case in turning a ready-mixed plant or a products plant over to precise control. When this is necessary, satisfactory preliminary results can be secured by hand weighing and mixing.

When the writer took over the control of concrete proportions in the three ready mixed concrete plants of Company X it was found that opera-

tions were largely by rule-of-thumb. As the first step in meeting strength specifications, which were allowed in the city in which Company X was located, it was necessary to establish the cement/water—strength relationship by means of curves. The equipment then in operation was not adapted to determine or compensate for surface moisture in the aggregates, nor to measure the added mixing water accurately. In order to start operations it was decided to prepare hand weighed and mixed batches, from which standard test cylinders would be made.

The cement/water ratio (weight of cement divided by weight of total mixing water), was decided upon rather than the water/cement ratio, although it is recognized that the latter is commonly used. In practice the cement/water ratio seems a little more logical (as this ratio increases the strength increases) and it is

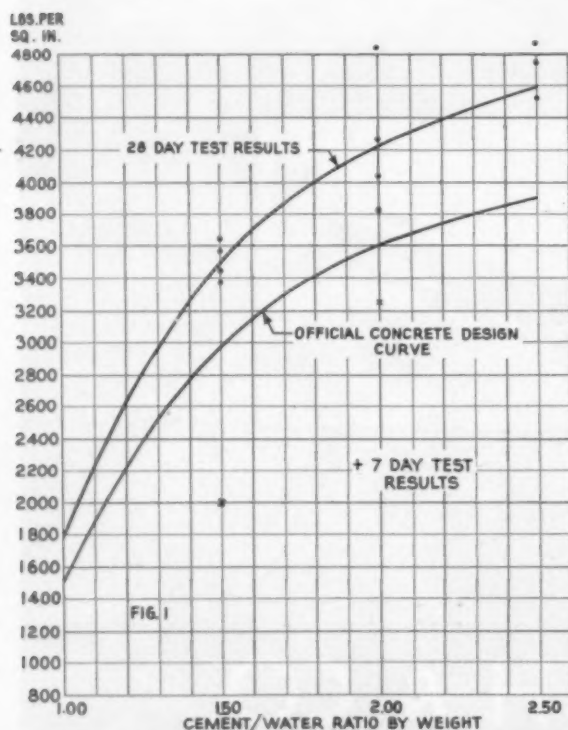


Fig. 1: Concrete design curve. Concrete prepared from hand mixed test batches (see Table 1). Curve to be used for design is 15 per cent below actual test result curve. All test cylinders showed strengths higher than Official Design Curve

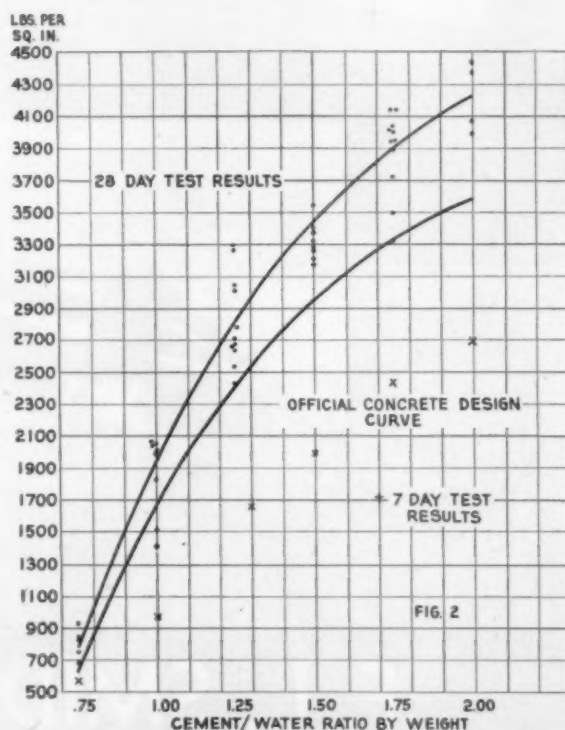


Fig. 2: Concrete design curve. Concrete proportioned with automatic weighing and accurate compensation for surface moisture. Proportions of aggregate were designed for economy and mixed in transit mixer. Test results from several different sets of batches on different days

somewhat easier to use in making computations. This is not of vital importance, however, and either can be turned into the other by dividing into 1.

Test Procedure

For these preliminary mixes, since adequate compensation equipment was not available, it was decided to use air dried aggregate. While this will have a slight amount of absorption, and therefore theoretically will slightly raise the strength for a given cement/water ratio, other factors due to hand mixing will usually more than compensate for this slight increase. Also a 15 percent margin below test results was required for the design curve. If this type of determination is used in preliminary studies, the results should always be checked as soon as possible after compensating equipment is in operation.

Sufficient quantities of each aggregate to be used were spread out under cover and stirred repeatedly for several days until all surface water was evaporated. A trial mix showed that 38 percent sand and 62 percent gravel gave a mix with satisfactory workability. Approximately these proportions of aggregate were used throughout. The weight of a cubic foot of this mixture was determined and from this the amount which would be required for each batch of cylinders. Five 6- x 12-in. test cylinders were made from each batch, four being used for 28 day tests, one for 7 day.

From previous studies it was thought that a cement/water ratio—strength curve with cement/water ratios from 1.0 to 2.5 (water-/cement ratios of 1 and .40, respectively) would cover the strengths required on the work. Batches were accordingly made having cement/water ratios of 1.0, 1.5, 2.0, and 2.5.

Approximately 10 percent more than the estimated weight of sand and gravel for each batch was weighed out and thoroughly mixed on a concrete floor. Equal weights of cement and water, estimated to be somewhat more than would be required, were placed in a container and thoroughly mixed into a cement/water paste. This was constantly agitated while being poured into a crater in the pile of sand and gravel, and the whole was mixed. Paste was added until the batch was in an easily workable condition. The molds were then filled according to standard practice, and later were cured and tested by the city testing laboratory. The amount of C/W paste remaining was weighed, and the amount used determined. From this the amount of cement and water used was computed, and from this the cement factor (pounds of cement per cubic yard of concrete) was determined.

TABLE 1: DATA FOR HAND MIXED TEST BATCHES TO DETERMINE THE CEMENT/WATER RATIO—STRENGTH CURVE

Batch No. 1—C/W by Weight—1.0		Batch No. 3—C/W by Weight—2.0	
Cement	13.0 lbs.	Cement	26.0 lbs.
Water	13.0 lbs.	Water	13.0 lbs.
Sand	52.6 lbs.	Sand	48.0 lbs.
Gravel	84.0 lbs.	Gravel	75.5 lbs.
Slump	1½ in.	Slump	5 in.
Cement Factor, per cu. yd.	320 lbs.	Cement Factor, per cu. yd.	636 lbs.
Batch No. 2—C/W by Weight—1.5		Batch No. 4—C/W by Weight—2.5	
Cement	19.5 lbs.	Cement	32.5 lbs.
Water	13.0 lbs.	Water	13.0 lbs.
Sand	50.3 lbs.	Sand	45.7 lbs.
Gravel	80.0 lbs.	Gravel	72.7 lbs.
Slump	5 in.	Slump	3 in.
Cement Factor, per cu. yd.	479 lbs.	Cement Factor, per cu. yd.	795 lbs.

The above procedure was repeated for each cement/water ratio, the chief difference being in the consistency of the paste. For the second batch the weight of cement was 1.5 times the weight of water; for the next, 2 times; and for the last, 2.5 times. The data for each batch are given in Table 1.

Strength Tests

After curing for 7 days one cylinder of each batch was broken. The 7 day test is not standard, yet it is fairly reliable and at times gives a valuable accelerated check on expected strengths. The balance of the cylinders were tested at 28 days, and the results plotted as shown on Fig. 1. The curve was drawn through the average of the unit crushing strengths for each cement/water ratio. Since the city regulations required that the working curve should be 15 percent below the test curve, points having a strength value of 85 percent of the test value for each cement/water ratio were determined and the design curve drawn through them. This latter curve became the official curve for designing concrete mixes to meet strength requirements.

It was recognized that, due to hand proportioning, air drying and hand mixing, the curve as determined above probably was not an exact measure of the results which would be secured under full control, although it was believed to be thoroughly reliable, and proved to be very close to later results using full equipment. Hence, as soon as possible after the plant was in operation, additional test cylinders were made. These were made with full compensation for moisture, and using the proportions which had been found to be desirable for economy and placeability. These batches were mixed in regular transit mixers, exactly as for delivery to the customer. It had been found that the original strength curve did not go quite low enough, and that a cement/water ratio of 2.0 was sufficiently high. Also the points on the curve needed to be somewhat closer. To meet these needs it was decided to make batches hav-

ing cement/water ratios of .75, 1.00, 1.25, 1.50, 1.75 and 2.00. By this time all necessary determinations of specific gravity, grades of aggregates, etc., had been made. The batches for strength determinations were accordingly designed in detail. In order to insure that mixing conditions would be entirely comparable with those in actual operations it was decided to use a full cubic yard batch. In order that the concrete not used would not be wasted, the batch was designed for one cubic yard plus twice the estimated amount of concrete needed for the test batch.

Extreme care was exercised in weighing the various ingredients, and especially in determination of and compensation for the surface moisture carried by the various aggregates. After mixing for the standard time, one half the estimated amount of concrete was discharged and wasted. This was to insure a thoroughly mixed sample. A second equal amount was then discharged and immediately placed in moulds, which were cured and tested according to standards. The transit mixer was then run back under the weighing hoppers and sufficient ingredients added to give a full load which was then delivered to the job.

A part of the cylinders were again tested at seven days, the remainder at 28 days. The results are shown in Fig. 2. A comparison of these values with those of the preliminary tests shows remarkable similarity. This bears out the previous assumption that the results from the hand batches would be reliable and safe. The Official Design Curve shown in Fig. 2 was used with very satisfactory results.

When operations are under strength specifications it is of course necessary to determine the cement/water ratio—strength curve for each type of cement used. It is also necessary to make check determinations frequently to insure that the curve continues valid and that the concrete as delivered to the job actually comes up to expectation. The check of the curve should be performed with pre-

(Continued on page 104)

New Markets

Lime Association Directors Hold Meeting

National Lime Association discusses research program, basing point decisions, new markets, construction lime tests, and association reorganization

THE NATIONAL LIME ASSOCIATION held a Board of Directors meeting at Hot Springs, Va., May 17-19, in lieu of its annual convention, to transact business of the Association and to hear and discuss reports and papers on research, promotion and other activities. Practically the entire Board was in attendance.

Officers of the Association were re-elected, comprising K. L. HAMMOND, chairman of the board of directors; S. WALTER STAUFFER, president and general manager; JAMES H. McNAMARA, treasurer; and ROMA M. TURPEN, assistant secretary. The only change in the Board of Directors is that Russell Rarey, vice-president, The Marble Cliff Quarries Co., Columbus, Ohio, succeeds E. C. Powers of the same company in district 5-B.

The Resolution's committee presented a resolution to the Association paying tribute to lime manufacturers who had passed away since the last meeting. These men were Herbert W. Dean, William J. Stewart, Charles H. Kammann and Judge Bernard Mason. It was resolved that appropriate tribute be conveyed to the families and associates of these men who have contributed much to the development of the lime industry.

Safety Contest Winners

Roma Turpen announced the winners of the 1944 safety competition conducted by the National Lime Association. Certificates of honor have been awarded to nine plants that completed the year without a lost-time accident. These plants are the following:

Genoa plant of the United States Gypsum Co.
York plant of the National Gypsum Co.
Martinsburg plant of the North American Cement Corp.
Asbury plant of the Standard Lime and Stone Co.
Thomasville plant of the J. E. Baker Co.
Thornton plant of the Marblehead Lime Co.
Houston plant of the Nyotex Chemicals, Inc.

Falls Village plant of the United States Gypsum Co.
Salem plant of the Salem Lime & Stone Co.

An improvement in safety tentatively was indicated during the year, with a decline in frequency and severity rates. The frequency rate was 37.374 as compared to 43.806 in 1943 and the severity rate was 4.216 as compared to 5.076 in 1943.

President's Report

S. WALTER STAUFFER, president and general manager, in his annual report, summarized the Association activities in research, promotion, government regulations and other matters since the last meeting. Among the general activities reviewed, he mentioned that two additional wage rate studies have been completed for the industry and that the surveys are to be continued. The Association was instrumental in securing a further extension of the exemption of the lime industry under the Renegotiation Act in March, which covers all the fiscal years ending between July 1, 1943, and June 30, 1945. Among other general mat-



Roma Medford Turpen, recently elected assistant secretary



K. L. Hammond, chairman of the board, National Lime Association

ters, a preliminary study of alien patents is being made and the Association has been very active in assisting war agencies on lime problems and member companies on priorities, manpower, price adjustments, etc.

Research for the construction department has been conducted at an accelerated pace during the war period, principally through the fellowship at the Bureau of Standards and at the Massachusetts Institute of Technology, he said. Two meetings of the new mortar research committee have been held and as a result objectives for research have been clarified and a definite program adopted. Studies on important properties of mortar and the development of test methods will be undertaken first. The general research committee, and the specifications committee held two meetings and have prepared specifications on all types of structural lime, on lime plaster and lime stucco, and on masonry mortar which were approved by the Board at its January, 1945, meeting. The "lime in concrete" committee also has been active and is preparing a final report for publication, on data resulting from research at M.I.T.

Mr. Stauffer outlined the activities of the chemical division involving considerable cooperation with WPB in order to meet urgent demands of industry. Chemical lime has been, or will be, placed on the urgency list of commodities, which stands between the critical list requiring allocation and the essential list which, according to Mr. Stauffer, should be very helpful on many manpower problems.

The tonnage of lime sold for water treatment in 1943 was practically 400,000 tons, becoming the third largest chemical lime market. He

NEW MARKETS

predicted that the most promising field for new chemical tonnage post-war will probably be in the treatment of sewage and trade wastes.

At five state experiment stations, under a research program suggested by Dr. Firman E. Bear of the New Jersey Agricultural Experiment Station, the Association will spend approximately \$35,000 over a five-year period in a study of the value of calcium and magnesium in correcting soil acidity and as soil food.

Use of Basing Points

ABRAM F. MYERS, counsel for the Association, in a paper "Use of Basing Points Under the Clayton Act," outlined recent decisions handed down by the United States Supreme Court in the Corn Products Refining Co. vs. Federal Trade Commission and Federal Trade Commission v. A. E. Staley Manufacturing Co. cases. The rulings in these trials are significant to all industries in which freight may be a controlling factor in the delivered price when products are sold on competitive markets.

The substance of the rulings was that the use by a single manufacturer of a basing point remote from his plant in selling his products at delivered prices in interstate commerce violates Section 2 of the Clayton Act as amended by the Robinson-Patman Act if resulting discriminations have, or may, have the effect to lessen competition among purchasers of such products, provided the manufacturer cannot justify such discriminations on any of the grounds enumerated in the Act.

Mr. Myers reviewed prior decisions on basing points as well, including the 1924 ruling ordering U. S. Steel to cease and desist from sales of rolled steel products on the Pittsburgh Plus pricing system. This case involved a single basing point for steel plants located over the country. The decision of the court was not contested.

In commenting on the Maple Flooring Association and cement manufacturers cases, versus the United States, Mr. Myers said that basing points were cited as parts of alleged price-fixing conspiracies in suits brought under the Sherman Act, and in the Federal Trade Commission case against southern lime and cement manufacturers, basing points were attacked as alleged price-fixing schemes under Section 5 of the Federal Trade Commission Act.

In his analysis of the Corn Products Refining Co. decision, Mr. Myers said that two plants manufacturing glucose were involved, one at Argo, Ill., within the switching district of Chicago, and the other at Kansas City, Mo. The basing point was Chicago for shipments from Kansas City. Glucose was sold only at delivered prices computed by adding to

a base price at Chicago the published freight rate from Chicago to the several points of delivery even though deliveries were made from the Kansas City plant as well as the Chicago plant.

The court said that this practice resulted in purchasers outside of Chicago paying a higher price which was unfair and that on shipments from Kansas City to purchasers having a lower freight rate from Kansas City than from Chicago, the delivered price included "phantom" freight (the difference in freight rates).

The court held that this "results in systematic price discrimination" on the ground that prices received on deliveries from Kansas City "bear relation to factors other than actual costs."

The Clayton Act prohibits only those discriminations whose "effect . . . may be to lessen competition or tend to create monopoly or injure, destroy or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination, or with customers of either of them." Mr. Myers emphasized that the word "may" really means "probably." In the Corn Products case the court found "phantom" freight to comprise 2 to 19 percent of the Chicago base price and that several candy manufacturers actually moved to Chicago since the effect of small differences in price was to divert business to other manufacturers.

"The Act in its present form," said Mr. Myers, "places emphasis on individual competitive situations rather than upon a general system of competition," and he stated that industries using basing points will find it difficult to determine whether or to what extent they may safely continue the practice.

In his further comments on the



Wallace Wing, president of Marblehead Lime Co.



John F. Gruber of St. Regis Paper Co.

Maple Flooring Association and cement cases, Mr. Myers said the Chief Justice might have been more helpful had he dwelt more on the negative or trivial effect of the basing point systems involved therein on competition—either among manufacturers or among customers.

He said that, in any attempted application of recent rulings, it is the effect—actual or probable—on competition that determines whether the discrimination incident to basing points are prohibited by the Clayton Act.

The use of basing points appear to be illegal, he said, in the following:

1. Where the effect is to yield the shipper a price f.o.b. shipping plant higher than the current selling price f.o.b. plant to other purchasers for products of like grade and quality.
2. When the effect is to yield a shipper an f.o.b. shipping plant price lower than the others, except where in good faith to meet an equally low competitor's price.
3. Where delivered prices quoted upon prices established by the shipper f.o.b. shipping points other than the point of origin, to which transportation charges are added from such shipping points and which are discriminatory as compared to current prices and transportation charges from the point of origin of the shipment.
4. The establishment of zone or district delivered prices where the transportation charges vary as to destination within the zone or district with the result the shipper discriminates in the net price yield f.o.b. shipping point between different customers.
5. Under the guise to "meet competition," making a discriminatory delivered price by using the estab-



Burton A. Ford of The Thos. Phillips Co., chatting with Jim McHamara, a pioneer in the lime business

lished plant price plus the transportation cost of another shipper when he is not affording competition.

6. To "meet competition," to discriminate by matching published delivery price of a product which is not of competitive grade and quality.

7. To enter contracts with favored customers without the same to all unless the price is justified by differences in cost of manufacture, sale or delivery resulting from differing methods or quantities.

8. Granting discriminatory discounts or conditions to selected customers for products of like grade and quality, unless justified as above.

9. If prices are increased while extending protection at the old prices to favored customers.

In conclusion, Mr. Myers stressed the importance placed on "good faith" in all price deviations arrived at to meet competition and said that the courts frown on "phantom" freight and "phantom" competition.

Sewage Treatment

Dr. WILLEM RUDOLFS, Rutgers University, reported progress of work done and suggestions for future work under the National Lime Association Fellowship on the treatment of sewage and industrial wastes, which is divided into two parts: (1) obtaining basic information regarding the action and behavior of various types of lime; and (2) the practical application of the use of lime to various methods of treatment.

Perhaps the two most important statements under the first subject—behavior of various types of lime—are these:

"Whenever lime is used in conjunction with other chemicals, its behavior and action appears to change. Very little information is available to explain these phenomena.

"The physical property of lime which is most important in sewage and waste treatment is solubility. Crystalline structure, texture, particle surface area, particle size, and dispersability all affect the solubility, hence the effectiveness of lime for sewage and waste treatment will vary with different types of lime."

Under the second subject—applications of lime—Dr. Rudolfs reported sludge digester overflows at many sewage plants are difficult to handle and troublesome. For clarification of and removal of oxygen consuming materials from these supernatant liquors lime in solution in conjunction with ferric chloride is the most efficient. Lime in solution was as effective as ferric chloride, produced less sludge, and was lower in cost.

In the treatment of industrial wastes the studies have concerned primarily acid neutralization and treatment of laundry wastes. Neutralizing agents for acid wastes were calcium and magnesium hydrates, quick limes, limestones, soda ash, caustic soda and their combinations. A combination of dolomitic hydrate and soda ash was better than lime, soda ash or caustic soda alone. Excessive sludge formation could be prevented by use of the proper type of lime and dilution.

New Market for Limestone

Most interesting to all limestone producers was Dr. Rudolfs' description of a new method for neutralizing acid wastes by means of an upflow limestone bed. At present several plants utilizing this method have been built or are under construction. The treatment plant consists essentially of a tank filled with small-sized limestone particles (about 98 percent passing 8-mesh and 99 percent retained on 20-mesh), having the largest possible surface area, through which the flow of acid waste is passed upward with such velocity that the limestone bed is expanded, or the limestone particles kept in suspension.

For laundry wastes a lime-magnesium sulphate treatment appears to be not only feasible, but simpler and lower in costs than other chemical treatment. Several large commercial laundries are trying out the process, Dr. Rudolfs said.

In conclusion of his report, Dr. Rudolfs suggested that the field of industrial wastes treatment offered the greatest opportunity. Of these wastes those that offer the greatest

possible use for lime are those of the chemical industries, metals (pickling liquors), vegetable and fruit canneries, coal washing and mine acid, textile, dye, meat, dairy, laundry, tannery, paper industries, and possibly the fermentation industries. New industries, in which little research on treatment of wastes has been done, are pharmaceuticals, especially vitamins, hormones and penicillin production. All these produce very acid wastes.

Construction Lime

Prof. HOWARD R. STALEY, Massachusetts Institute of Technology, reported on the Association sponsored research in mortars and masonry. In making this 12th annual report he called attention to the fact that twelve years ago, in 1933, the usual mortar specification was 1:3 with 10 percent of hydrated lime, while the present generally accepted specification was 1:2:9 (cement-lime-sand). The principal competitive materials are the masonry cements, which enjoy an unfair advantage because standard test methods require they be tested in 1:3 mixtures by weight, which naturally gives a richer and stronger specimen than a 1:2:9 mix by volume. A 1:3 mix (1 = cement + lime and 3 = sand) by weight gives about 100 percent greater compressive strength in 28 days than the same materials mixed 1:3 by volume. Therefore, tested by the same methods the 1:2 cement-lime material would pass masonry cement specifications.

Prof. Staley reported in considerable detail on plaster research to date, but results so far are inconclusive. Mixes of hydrate with various additions of hot water, hydrochloric acid, limestone, flyash, powdered flint or Georgia kaolin clay are being tried with some promising aspects.

Surface Areas of Limes

A part of the research at M.I.T. includes fundamental research on the properties of lime. In this connection Prof. Staley reported on the surface areas of 21 limes, determined by the nitrogen adsorption method. He said: "It is relatively certain that all of the phenomena associated with the use of lime in any application is a function of the surface area of the material. That is, the chemical reactivity and the physical behavior of limes is related in some way to surface area." He found that surface areas of hydrated limes vary from 65,400 sq. cm. per gram to 194,900. One portland cement, determined by the same method, had 8960 sq. cm. per gram, which gives an idea of the relative fineness of portland cement and hydrated lime.

Milling and air classifying increased the surface area of a pres-

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New Interpretation of the Wage-Hour Act

Directors of the National Sand and Gravel Association and National Ready Mixed Concrete Association meet in Chicago to discuss status of industries under Wage-Hour Act ruling. Also discuss O.P.A. price adjustments, air-entraining cement and other problems

A JOINT MEETING of the Board of Directors of the National Ready Mixed Concrete Association and the executive committee of the National Sand and Gravel Association was held at the Palmer House, Chicago, on V-E Day, May 8, called principally to consider the recent ruling issued by L. Metcalfe Walling, Administrator of the Wage and Hour Act.

Mr. Walling had issued two statements with respect to the application of the Act to the ready-mixed concrete industry and the sand and gravel industry which, if upheld by the courts, will make these industries almost 100 percent subject to the minimum wage and overtime provisions of the Act. His recent interpretation has the effect of widening the classifications of employees considered as engaged in the production of materials for commerce.

Both industries, through their executive offices, consistently had sought clarification of the Act since it came into effect in 1938 and now, for the first time, the Administrator has ruled that the industries come under certain of its provisions in spite of many previous rulings to the contrary.

On March 13, 1945, Mr. Walling had issued a statement that contained the following paragraph:

"For example," Mr. Walling continued, "employees must be considered engaged in the production of goods for interstate commerce when engaged within a State in such activities as producing ice, electric energy, railroad ties, crushed rock, bituminous aggregate, ready-mixed concrete, telephone and telegraph poles, or other similar items for use or consumption wholly within the same State by interstate railroads, telegraph or telephone companies, etc., in carrying on interstate transportation or communication; or for use or consumption within that State in the maintenance, repair, or reconstruction of essential instrumentalities of interstate trade, commerce,

transportation, transmission or communication."

Later, on April 10, 1945, in a letter to V. P. Ahearn, executive secretary of both Associations, he had stated:

"Employees of a materialman who are engaged in producing or delivering sand, gravel, ready-mixed concrete or similar materials for use within the State where the materials are produced are not considered to be engaged in interstate commerce (as distinguished from the production of goods for commerce) except in situations where they participate in covered construction, repair, or maintenance of instrumentalities or facilities of commerce, as for example, by spreading such materials on the roadbed of an interstate highway. See the Divisions' release G-162, issued May 15, 1941. Since we have not previously notified your association that employees exclusively engaged in transporting such materials to a construction site within the State and discharging their loads at such a construction site, are under certain conditions engaged in interstate commerce as distinguished from the production of goods for commerce, the Divisions will take no enforcement action based on engagement by such employees in interstate commerce prior to April 15, 1945.

"Employees of a materialman who are engaged in producing or delivering sand, gravel, ready-mixed concrete or similar materials for use within the State where such materials are produced may be covered by the act as employees engaged in the production of goods for interstate commerce, even though they may not be engaged in interstate commerce. This is true not only of employees who will be considered engaged in producing such materials 'for commerce' as explained in the Divisions' release A-14, but it is also true, as the Divisions have consistently maintained, of employees performing work necessary to the production of other goods for interstate



V. P. Ahearn

commerce. For example, employees hauling ready-mixed concrete to an oil-well site and discharging it into forms prepared for the foundation of the oil derrick would be considered covered on this ground if oil from the well may be expected to move to other States. Cf. *Warren-Bradshaw Drilling Co. v. Hall*, 317 U. S. 88, *Kirschbaum v. Walling*, 316 U. S. 517. Similarly, employees hauling such concrete to a factory used to produce goods for interstate commerce and pouring it into forms prepared in connection with the reconstruction or repair of the factory building, are engaged in work necessary to the production of goods in the factory. Cf. Interpretative Bulletin No. 5, paragraph 13. Many similar examples of this basis of coverage could, of course, be given."

In view of these interpretations, which admittedly have critical implications insofar as many companies in both industries are concerned, Mr. Charles A. Horsky, a member of the law firm of Covington, Burling, Rublee, Acheson and Shorb of Washington, D. C., attended the meeting and discussed procedures available to the Associations in the event they should decide to test the legality of Mr. Walling's rulings.

Mr. Horsky dwelt at considerable length on a long list of earlier interpretations that were absolutely contrary to the Walling statements, much of which had been previously discussed and made available to industry members of both Associations. Briefly, prior rulings have been changed in two respects: employees who produce or deliver sand, gravel or ready-mixed concrete to be used in the construction or repair of instrumentalities of commerce, such as highways or railroads are now covered by the Act; and drivers who deliver materials (probably only

ready-mixed concrete) into forms in industrial maintenance or for such projects as oil well construction are covered.

Mr. Horsky's opinion is that the use of materials of the industries is so far removed from the uses of the commodities (ice) involved in three separate cases upon which Mr. Walling has relied for his decisions, that the industries would have a reasonably good chance to win a reversal if legality of the rulings should be contested. After considerable discussion, it was decided that the principal objective of the Associations should be to assist individual member companies in the event of litigation action instituted by the Wage and Hour Division. Mr. Horsky will also prepare a report for members setting forth the whole problem in detail and outlining alternate courses of action.

V. P. AHEARN mentioned that insofar as exemptions are concerned, even officers of corporations have been held to be employees under the wage and hour laws. In commenting on travel time allowance for dredge operation, Mr. Ahearn mentioned the very recent decision of the Supreme Court, upholding portal-to-portal payment for coal miners, as probably having a bearing. He cautioned against requiring any man to be at a certain place at a certain time for transportation to the place of employment. In the matter of seasonal exemptions, Stanton Walker, director of engineering, told how the zones, which determine the work year for plant operations, may be extended in special instances. Where all production is confined (90 percent) practically to six months of the year, favorable reaction has been secured in a number of cases.

Inasmuch as the owner-driver problem may be affected by the Walling ruling, if it is proved legally, a letter on the subject by Robert Ash, attorney, was reviewed. Mr. Ash is of the opinion that the Grand Rapids Gravel Co. versus United States of America case, decided in favor of the Government, and which was believed to be a test case for the industry, does not dispose of the matter. In his letter, he based that opinion on the peculiar facts in the case and on later decisions in the courts, a number of which he cited. In one of the cases, Manning and Locklin Northville Co. versus Michigan Unemployment Compensation Commission, owner-drivers did the hauling for the sand and gravel producer under a written contract. The owners' names appeared on the trucks. It was held that they were independent contractors and that the company was not liable for payment of social security taxes and the withholding of income taxes. The other cases were every bit as significant. It was cautioned in the



Stanton Walker presented a progress report on concrete with entrained air

decision, that State laws on unemployment compensation will bear examination.

In his discussion of the child labor provisions of the Wage and Hour Law, it was pointed out that boys less than 18 years of age might not be employed as truck drivers.

At the luncheon session there was a discussion of the outlook for the construction industries in terms of price control.

Price adjustment procedures that are available were discussed, for an industry as well as for individual producers which must be based upon proof of local shortages of materials. It was mentioned that the latter procedure was the means of securing a price adjustment of 20c per ton for sand and gravel producers in St. Louis, Mo. To secure an industry adjustment would involve application to the Washington office of O.P.A. and examination of data which must be submitted by all members.

In the new regulations being written, any member of the construction industry will be permitted to file application for price relief, and consideration will be given only if the applicant's supply cannot be replaced or if only at higher prices. Criteria for establishing prices will be as follows: If earnings exceed 115 percent of the base period earnings (1936-1939) base period), the adjustment will return the manufacturing cost. If earnings were between 100 and 115 percent of those for the base period, total cost including overhead and selling cost would be recoverable. If earnings were less than 100 percent, total cost and a reasonable profit would be recoverable.

A local shortage of sand or gravel or ready-mixed concrete, or an imminent threat of a shortage would be justification to file a claim for price adjustment, he said, but that small local area claims should be filed. One

of the members mentioned that the sand and gravel industry is accustomed to think of profits in terms of per ton of material and questioned if price relief were granted on an overall income basis if the procedure would not militate against post-war construction.

OTTO CONRADES expressed the satisfaction of St. Louis producers for the cooperation they had received from O.P.A. in securing price relief and emphasized the importance of compiling clear, concise data in presentation of a case.

It was pointed out that if sand and gravel prices are increased, there will be no automatic price increases granted for ready-mixed concrete. In the St. Louis case, ready-mixed concrete price increases were passed on after sand and gravel increases were granted. H. F. THOMSON and others insisted that adjustments should be granted on an area basis and not to just those who filed application, for competitive reasons.

An opinion was expressed that where an f.o.b. plant price was quoted (and that was the procedure when the Emergency Price Control Act became effective) and a separate hauler handled delivery, the price for trucking could be increased without approval of O.P.A.

Another member posed a difficult but important question when he asked the procedure where a customer had purchased material on either or both a plant price and a delivered price. There would be two ceilings in that event, and the question was which to apply. It is apparent that if no trucks are available, the f.o.b. price would govern.

On May 9, the Board of Directors of the National Ready Mixed Concrete Association held an all-day meeting. The entire morning was devoted to technical matters and discussion of research by Director of Engineering, Stanton Walker.

Study Concrete with Entrained Air

Mr. Walker discussed some preliminary results in a progress report on studies of concrete with entrained air, prepared by Delmar L. Bloem, associate research engineer of the Association and himself. The report covered the effect of entrained air on the mixing water requirements for concrete, and preliminary data on strength and modulus of elasticity results.

Three cement factors were used for the purpose of the tests—4.5, 5.5 and 6.5—with sand and gravel graded up to 1-in. size and three groups of tests were made for each. One group of tests was conducted with normal portland cement; and in the second and third, .02 percent Vinsol resin (in sodium hydroxide solution) was added to the batch in the mixing

water. Separate tests were made with sand reductions made to maintain the same absolute volume of coarse aggregate and cement per unit of volume of concrete as in the normal cement concrete, and using the same percentage of sand as with the normal cement concrete with a reduction in the total aggregate to maintain a constant cement factor. Air contents of the concrete containing Vinsol resin were purposely made much higher than recommended in order to magnify the effects, particularly on water content. The accompanying curves indicate some of the results obtained.

In the discussion, Mr. Walker predicted that five years from now normal cement will no longer be in use, and he also mentioned that more lenient sand gradations are practicable in concrete when air-entraining cement is used. In this regard, he presented some very enlightening figures, based on 4323 sieve analyses of concrete sand furnished by member companies and users, sent to the laboratory from all sections of the country. The average passing the 50-mesh sieve, for all these sands, was 13.6 percent. Sands from Illinois, Indiana, Mississippi, and North Dakota averaged less than ten percent minus 50-mesh. The overall average for minus 100-mesh was only 2.2 percent and samples from no single State averaged over 3.7 percent minus 100-mesh. These figures certainly emphasize the seriousness of the fine sand production problem.

Mixer Standards

There was considerable discussion of the transportation of concrete in dump body trucks. Mr. Walker believes that such truck bodies will not supplant agitators and that their application definitely is limited to certain classes of projects and lengths of haul. He emphasized that certain classes of hauls always have been made in dump trucks. H. C. Peters, chairman, Truck Mixer Manufacturers Bureau, in his report, explained the procedure in arriving at mixer standards. Rating plates are to be available July 1, 1945, when the new standards become effective, and the sale of plates is to be the source of revenue for financing the Bureau's program of activities which, Mr. Peters said, will include an advertising program in 1946. Mr. Walker has been vested with final authority in the approval of mixer designs.

The book, "Control of Quality of Ready Mixed Concrete," has been revised. The principal revisions consist of a new chapter covering the design of air-entrained concrete and one on the treatment of concrete after delivery.

V. P. Ahearn conducted the afternoon session. One of the subjects was a discussion on the proposed application to the O.P.A. for removal of

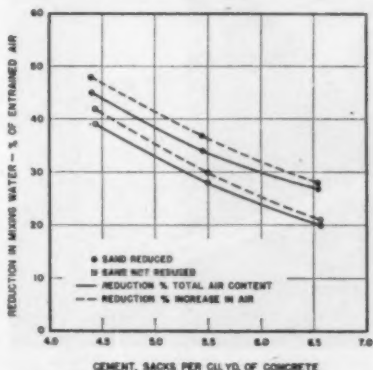
ready mixed concrete from the list of price controlled commodities. The distinction between the ready mixed concrete industry and the construction industry was brought out. It was pointed out that certain Government acts, such as Executive Order 9240, which apply to the construction industry, do not affect the ready mixed concrete industry. Various Government forms, such as Forms 1 and 10, were discussed, as was the recent Walling ruling.

The distinction between the Motor Carrier Act and the Wage and Hour Law was clarified during the round table discussion. It was mentioned that any driver of a transit mixer truck who had occasion to cross a State line during his work came under the Motor Carrier Act, which allows a 60-hour work week at straight time. The Wage and Hour Law requires the payment of overtime after completion of 40 hours.

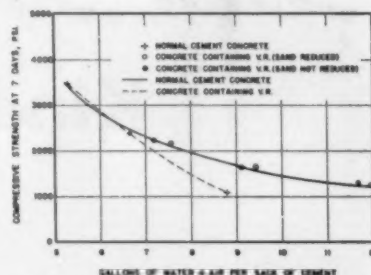
Mr. Ahearn stressed the point that the Association is always ready to help members clarify Government orders which may otherwise be confusing in their interpretations.

The decision as to whether the Board will hold a semi-annual meeting as well as the possibility of holding an annual meeting in 1946 was left up to the executive committee. The executive committee, elected at this meeting, consists of Alexander Foster, Jr., C. W. Shirey, and Alexander Johnson, respectively, the president, vice-president and secretary of the Association and C. D. Gray, E. J. Numan, T. E. Popplewell and Julius J. Warner.

Further discussion included the progress of the Merchandising Committee, the availability of trucks, tires, and new equipment, and disposition of surplus property. The general feeling was that the situation with respect to trucks and tires will ease considerably now that the war in Europe is over, and that new equipment will be more available for the same reason. It was felt that trucks will be available in late 1945 and in 1946 if proper priorities are obtained. The attitude of the W.P.B.



Effect of entrained air on mixing water



Relation between strength and gallons of water plus air per sack of cement

now seems to be one of eagerness to help the producer obtain necessary equipment.

Mr. Ahearn stated that he feels that restrictions against construction under the L-41 order of the W.P.B. will be distinctly relaxed in the near future.

Insofar as business matters are concerned, the executive committee is to consider the appropriation of additional funds for counsel fees. A report will also be made on the scale of dues, the consensus of opinion being that a higher rate of income should become effective January 1, 1946.

Registration

The registration for the combined meeting was as follows:

- V. P. Ahearn, National Sand and Gravel Assn., Washington, D. C.
- William M. Avery, Pit and Quarry, Chicago, Ill.
- Claude L. Clark, Ohio Sand and Gravel Assn., Columbus, Ohio.
- I. M. Cliequennol, Waukesha Washed Sand and Gravel Co., Milwaukee, Wis.
- Otto S. Conrades, St. Louis Material and Supply Co., St. Louis, Mo.
- Jeremiah J. Dalton, Jr., N. Ryan Company, Brooklyn, N. Y.
- E. K. Davison, J. K. Davison and Bro., Pittsburgh, Penn.
- George McC. Davison, J. K. Davison and Bro., Pittsburgh, Penn.
- H. S. Davison, J. K. Davison and Bro., Pittsburgh, Penn.
- B. P. Devine, Chain Belt Co., Milwaukee, Wis.
- Joseph H. Dixey, Joseph H. Dixey Company, New York, N. Y.
- Alexander Foster, Jr., Warner Company, Philadelphia, Penn.
- Norman J. Fredericks, Koenig Coal and Supply Co., Detroit, Mich.
- William S. Giles, Iron City Sand and Gravel Co., Pittsburgh, Penn.
- William Goldie, Goff-Kirby Company, Cleveland, Ohio.
- Paul C. Graham, Graham Brothers, Los Angeles, Calif.
- C. Dolly Gray, Ready Mixed Concrete Corp., Indianapolis, Ind.
- Frank Hagen, Graham Brothers, Los Angeles, Calif.
- Louis G. Helkemeier, Chain Belt Co., Milwaukee, Wis.
- J. Rutledge Hill, Gifford-Hill and Company, Inc., Dallas, Texas.
- W. Edward Hole, American Aggregates Corp., Greenville, Ohio.
- Charles Horaky, Washington, D. C.
- V. O. Johnston, Lincoln Sand and Gravel Co., Lincoln, Ill.
- Jas. F. McCracken, American Builders Supply Co., Louisville, Ky.
- R. McLean, Jaeger Machine Co., Columbus, Ohio.

(Continued on page 100)

Sand Separation

Kinds of SCREENING

Sizing, Scalping, Bypassing, Rescreening, Washing, Dewatering

THE ARTICLE in this series, published in the May issue, pp. 75-77, described the essential differences in types of vibrating screens. There are numerous differences in the details of vibrating mechanism and methods of mounting the screen as between screens of the same general type made by the various manufacturers, which will not be discussed at this time. These are factors that may enter the problem of selecting a particular screen for a certain job, but before we reach a discussion of these factors it is best to get a fundamental understanding of the objectives of screening.

In the current article, as well as in the previous ones of this series, we are concerned only with screening sand, that is, material below $\frac{1}{4}$ -in. or No. 4 mesh. This is a problem somewhat different from that of screening coarser material and presents more complexities. Usually the problem of screening gravel or crushed stone is not so difficult, and while some of the same factors apply to screening sand, there are others which do not. For example, nearly all texts on using vibrating screens lay emphasis on the "jigging" effect. In jigging the fine particles of the feed work down through the material, so that the larger sizes come to the top. Jigging of course facilitates getting

By NATHAN C. ROCKWOOD

the finer particles through the screen meshes, which is the purpose of using a screen.

However, jigging depends on the free movement of the various sizes on the screen bed. Real jigging is done under water where there is free movement of the particles with the water acting as a lubricant. Some jigging effect can be had if the materials are bone dry, especially in the case of rounded particles, as are some silica grains. But as ordinarily practiced in commercial sand and gravel plants, vibrating screens have very little if any jigging effect on damp or saturated sand. The finer material sticks to the coarser particles and water sprays and plenty of water must be depended upon to help the screen make a clean separation.

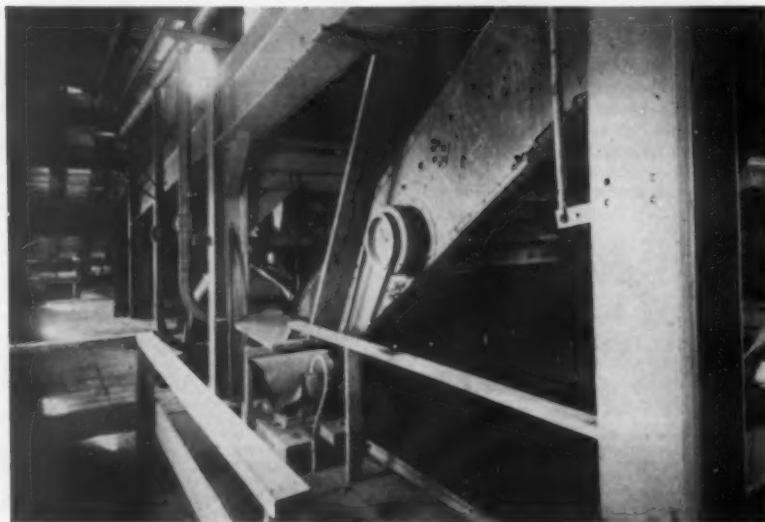
Use of Water

In the foregoing paragraph we have said "as ordinarily practiced in commercial sand and gravel plants." Our good and helpful friend, R. J. ROBERTS, of the Deister Machine Co., calls our attention to the possibility of feeding sand to a vibrating screen so that advantage can be taken of the jigging effect. He writes: "Many op-

erators do not seem to realize the importance of the degree of feed saturation in wet screening. This applies to coarse as well as fine screening. To obtain the greatest efficiency, the feed to a screen, so far as moisture content is concerned, should be in substantially the same condition as the pulp in the sorting column of a hydraulic classifier; that is the particles should be able to move freely over and around each other in the pulp bed—in a state of 'teeter' as it were. If the feed is thus prepared *before reaching the screen*, the undersize will stratify almost instantaneously, and from 90 to 95 percent of the 'easy' particles will pass through the screen with the water within the first few feet of the feed end. In fine screening the use of water sprays as such is a detriment rather than a benefit, as they serve more to drive 'near' sizes into the meshes and cause blinding. If sprays are used at low pressure or low velocity and serve only to keep the water in the bed of the feed, they may be of some value."

Mr. Roberts continues: "I always feel pretty positive about this phase of screening. My first experience was acquired some years ago in the old Federal mill at Picher, Okla., where we had a 3- x 4- ft. vibrating screen equipped with a 30-mesh screen cloth, taking a feed of minus 6-mesh. After finally adopting a feed dilution of about 3 to 1, adding the water in the launder leading to the screen, we were able to cut out the spray pipes, for we were getting better than 90 percent screening efficiency within the first 16 in. of the screen."

In this connection, according to Mr. Robert's theory and experience, it would make a lot of difference how the water sprays are directed and with what pressure. To get the maximum jigging effect perhaps low pressure sprays would be better directed to the underside of the screen than to the top side. Also, if high pressure sprays are used, possibly it would be better to direct them upward against the flow of material, or downward with the flow, depending on the slope of the screen, rather than perpendicular to the screen surface. In other words the water sprays can be used as a substitute for changing the screen inclination, or to supplement such a change.



One of two single-deck vibrating screens at 40-deg. angle for screening dry sand. Metropolitan Sand and Gravel Co.

SAND SEPARATION

At present few sand and gravel plant operators believe it is feasible to attempt the sizing of sand with vibrating screens below 20-mesh, but we have seen from the article in the April issue, pp. 69-70, that it is feasible to separate a 30-mesh sand with plenty of water on a 26-mesh screen cloth, from a feed containing probably not over 20 percent of undersize. If the proportions had been reversed with 20 percent plus 30-mesh and 80 percent minus 30-mesh, the results would be quite different, if only a single screening surface were employed.

There is now a tendency toward vibrating screens that will operate horizontally, or very nearly horizontally, while submerged or partly so. This permits a jiggling action and helps prevent blinding. Probably this new type of vibrating screen will be developed to serve many of the present purposes of hydraulic classifiers for sands coarser than 30-mesh or possibly even 50-mesh. When it does become possible to remove the usual excess of material between these two sizes by a simple screening operation, the problem of making a close specification concrete sand will be much simplified.

Sizing

Ordinarily a vibrating screen is put in the flowsheet of a sand plant to make a single size separation, say to remove particles over No. 4 or No. 8 mesh, whichever is the top size for the sand. The oversize is rejected as a sand product and the undersizes or throughs are a finished product, unless there is an oversupply of certain sizes, usually between minus 16-mesh and plus 50-mesh, or possibly between 30-mesh and 50-mesh. As we have seen, much remains to be developed in using screens for separations in this latter size range.

Sizing has been described* as the operation where an average of about 60 percent of the feed will pass the screen, where high efficiency and high capacity are both desired, and where there may be an excessive amount of material near the desired mesh size.

Scalping is described as the case where 85 to 95 percent of the feed material is considerably smaller than the screen mesh; close sizing is not the objective but fairly high efficiency in making the separation is an objective. In a sand operation scalping would be the removal of a small amount of oversize from a product

*Sizing, Scalping, Bypassing, Rescreening, Washing and Dewatering, as different kinds of screening are best defined, according to our searches, in The Jeffrey Manufacturing Co.'s Catalog No. 750, published in 1943. Much of what follows here is based on the discussion of screening in this catalog, through the courtesy of Herbert J. Flint, manager, Jeffrey-Taylor division of the company.



Battery of 3x5 ft. vibrating screens. Wedron Silica Co.

destined for further processing, or from an otherwise finished product, as in the case illustrated on p. 70 of the April issue in the final screening of the minus 30-mesh sand.

By-Passing is the case where there is a high rate of feed with only 5 to 20 percent of throughs. As practiced in the commercial sand industry, bypassing is usually a rescreening operation such as that illustrated on p. 70 of the April issue in the final processing of the plus 30-mesh sand. Also it could be called a final washing operation. The terms "by-passing" "rescreening or dedusting," "washing" and "dewatering" are terms which apply to more or less similar processing operations beyond the scope of those employed in the commercial sand plant, and are not pertinent to the present discussion. So there are really three sand operations to be considered: (1) sizing, (2) scalping, (3) rescreening or washing.

Screening Techniques

Three questions that have been asked by producers are these: (1) what size screen do I need to do a certain job; is there any accepted relationship between capacity in cubic yards or tons and the area in square feet of the screen surface? (2) Should I use a sloping or a horizontal type screen? (3) Is it advisable to get a single, double-or triple-deck screen?

The first question is easily answered "No." There is no generally accepted formula for estimating screen capacities. Every vibrating screen manufacturer has a formula that he uses in the light of his experience in screening the particular kind of material offered, or a similar material. Consequently you seldom see screen capacities in catalogs or advertising. When presented with a

screening problem the engineers of the screen manufacturer want the fullest knowledge possible of the material to be screened and the product or products desired.

The reason why "capacity" is indefinite without taking into account many considerations is best explained by A. D. SINDEN, assistant chief engineer of the Stephens-Adamson Mfg. Co., who says: "There is a relationship between capacity in tons and square feet of screen surface, provided the following items have fixed values: (1) size and shape of screen openings and cloth; (2) diameter of wire in screen cloth; (3) sieve analysis of material; (4) general character of material as to shape of particles; (5) speed, amplitude and character of vibration; (6) slope of screening surface; (7) ratio of length to width of screen; (8) moisture content of material; (9) efficiency of separation."

Mr. Sinden also says: "Let me emphasize what I believe is one of the most important of these factors, and that is (3) sieve analysis. I believe this factor alone can make a difference of as much as 3 to 1 in the relation of capacity to screen area, all other factors remaining the same."

Although he does not say so, the reason the screen analysis makes so much difference is explained by what has been written above. The screen analysis determines the kind of a screening job that is to be done.

Conclusions

The object of this discussion has been simply to demonstrate that screening sand is a real technical problem, and that to solve it satisfactorily the engineer of the vibrating screen manufacturer whom you

(Continued on page 102)

Move Plant to New Quarry

Rockydale Quarries Corporation building new crushing and screening plant replacing plant at depleted deposit

ROCKYDALE QUARRIES CORPORATION, Roanoke, Va., is constructing a crushing and screening plant at a new quarry site about six miles south of the city. Equipment from the plant at the old depleted quarry north of Roanoke is being moved to the new plant, and some new equipment is being added. Dolomitic stone at the new quarry is said to be particularly suitable for agricultural limestone which constitutes about two-thirds of present demand. This company has A.A.A. contracts in four Virginia counties.

New equipment recently purchased includes: a 3- x 10-ft. Barber-Greene feeder, two Barber-Greene belt conveyors, a 24- x 36-in. Tel Smith jaw crusher, a 5½-in. Loomis Clipper blast hole drill, a 3-ft. Symons short head cone crusher, and two 4- x 10-ft. Niagara double-deck screens. The new plant will have a production from 500 to 600 tons per day. Holman Willis is president of the company.

At the new plant, quarry stone will be fed to the Tel Smith jaw crusher, the throughs passing over a grizzly, made from Manganol rods, with 1-in. centers, and the oversize will flow by gravity to a 3-ft. Symons cone crusher set for a 1½-in. top size. Throughs from the grizzly and the product of the cone crusher will go to a belt conveyor which discharges to a stockpile over a reclaiming tunnel conveyor. This stockpile has a maximum recoverable capacity of about 9000 tons. Stone from the stockpile is fed by an 18- x 48-in. Jeffrey magnetic vibrating feeder to the 24-in. belt conveyor in the tunnel which inclines up to a 4- x 10-ft. double-deck Niagara scalping screen above a surge bin. At ground level, to one side of this bin, will be located two 3-ft. Symons short head cone crushers which will be fed either from the bin or take rejects from the screen. Crusher throughs will be taken by bucket elevator to two banks of 4- x 10-ft. double-deck Niagara screens placed above two storage bins which receive the various sizes.

At ground level on the other side of the surge bin will be located two No. 2 Sturtevant ring roll mills which also will receive material from the bins or the scalping screens above. A bucket elevator will take the stone from these crushers to a 4- x 10-ft. double-deck Niagara screen above another set of two storage bins. Re-

jects from all screens above storage bins can be chuted back to their respective crushers.

U. S. Condemns Quarry

ROBERT HOWARD, owner of a tract of land in Pacific County, Washington, said to contain perhaps the best hard rock quarry site in the county, was awarded \$3000 for the land, timber and rock in federal condemnation proceedings. There is said to be 10,000,000 cu. yds. of rock, and the government is spending \$100,000 for a highway to get it out. The government's original offer was \$2600. Rock will be used for jetties. Disregarding the testimony of prominent mining engineers, and lumbermen, the jury made the award of \$3000, although the witnesses for Mr. Howard contended that the property was worth from \$30,000 to \$50,000.

According to the report of the trial, Mr. Howard granted permission to the U. S. engineers to go over and prospect his land for rock suitable for use in the Columbia river jetties. Thereafter, instead of negotiating with the owner for the property, federal officials served him with a decree of taking and condemnation. Mr. Howard appealed the case to the federal court. Mr. Howard's witnesses testified that 5c per cubic yard was the usual price for hard rock. Government attorneys are reported to have insinuated that Mr. Howard was "obstructing the government in time of war," and referred to "poor widows buying war stamps to help win the war and pay for this property." Federal Judge Leavy is reported to have rebuked the federal attorneys for declaring that the defense had been fraudulent, declaring that there was nothing to substantiate such an assertion.

Mica Buying Program

COLONIAL MICA CORPORATION has announced the following mica buying program:

Purchases will be made under two classifications: Table A, prepared upon the "sliding scale" system which prevailed before May 24, 1943, and covering full-trimmed ruby muscovite mica; and Table B, covering No. 2 Inferior, or better, quality sheet mica. To qualify for purchases under Table B, producers must agree before April 1, 1945, to sell Colonial their entire production of No. 2 Inferior, or better, quality sheet mica

during the three-month period, and must have a production record showing that their mines in the past produced mica of which at least 25 percent has been No. 1 or No. 2 quality, separately or combined, and of which not more than 75 percent has been No. 2 Inferior quality. Unless such contracts are signed, purchases for the three-month period will be made only under Table A. Producers who elect to sell to Colonial under Table A will not be required to sell exclusively to Colonial unless existing production advance contracts or equipment leases require such sales.

Under Table A, prices will vary from 25c a lb. for Grade 6 No. 3 Quality to \$38.65 a lb. for Grade OXXX Special No. 1 Quality. Under Table B the price per lb. is \$2.25 f.o.b. shipping point nearest producer's rifting shop, for full-trimmed ruby muscovite domestic mica, having a minimum usable area sufficient to cut a rectangle with a width of at least ¾ in. and a minimum area of one square inch, ungraded as to size, and having mixed qualities none of which is below the quality of No. 2 Inferior.

Fluorspar Mine Accidents

FLUORSPAR mines in the United States reported to the Bureau of Mines that the number of men employed and manhours of employment increased and the overall accident-frequency rate decreased in 1943 compared with 1942.

The number of men employed at all fluorspar mines in 1943 totaled 1905, an increase of four percent over 1942. Manhours of employment rose from 4,124,652 in 1942 to 4,139,828 in 1943. Workers were active for an average of 271 days of 8.02 hours each. Accidents to the men at all mines caused eight fatal and 282 nonfatal injuries. Underground and shaft accidents accounted for seven of the fatalities and 248 lost-time injuries. Four of these deaths were caused by falls of rock or ore from the roof or wall. Principal causes of underground nonfatal injuries were falls of rock or ore from the roof or wall, handling materials (other than rock or ore), and haulage equipment. Fluorspar mines in Illinois and Kentucky employed 73 percent of the fluorspar miners in the United States, who performed 74 percent of the total volume of work.

Mexico Phosphate

THREE CONCESSIONS are reported to have been granted by Mexico for the exploration and exploitation of phosphate lands. These concessions are located near Monterrey, State of Nuevo Leon.

To Produce Feldspar

B. C. BURGESS of Spruce Pine, N. C., has leased properties near Monticello, Ga., and plans to produce feldspar in the near future.

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Rings in Cement Kilns

Part I: Why they form and how to prevent them

By HAROLD R. GINGERICH*



Harold R. Gingerich

THE FORMATION, prevention and elimination of slurry and clinker rings in rotary cement kilns constitutes one of the most pertinent problems in the manufacture of portland cement. Ring formation problems are encountered at all cement plants to a greater or lesser degree. The nature of the operation of processing or burning portland cement in the rotary kiln is such that there is continuously a wide variation in the kiln.

Deposits in the kiln are generally classified according to the material from which they are formed. Clinker rings form from the calcining zone to the end of the sintering zone. Slurry rings composed of raw material with some coal ash form in the preheating zone where mechanically held water is evaporated.

Both slurry and clinker rings interfere with the uniform flow of materials through the kiln and with the most efficient use of available heat. Clinker rings, particularly, reduce the fuel efficiency of kilns as they act as baffles which radiate the heat of the flame back into the clinkering zone, thus preventing it from entering the calcining zone, where it is needed.

The formation of kiln deposits is due to a number of faulty operating conditions. These may be grouped in three general classes: (1) Materials; (2) Laboratory control; (3) Kiln operation.

This article will deal particularly

*Assistant Chief Chemist, Standard Portland Cement Co., Painesville, Ohio. Graduated from Pennsylvania State College as ceramic engineer, and was formerly associated with the Medusa Portland Cement Co. at York, Penn., and also with the Carborundum Co., as research chemist.

with clinker rings, as these are probably the most troublesome. Another installment will deal with slurry rings, although much of the present article concerns kiln conditions that may cause formation of both kinds of kiln rings.

Influence of Materials

The physical and chemical compositions of the raw materials influence the formation of kiln deposits. Clay undergoes various physical changes during its decomposition; chief is reduction in volume which occurs to a varying extent depending upon its composition. This contraction takes place during drying and burning. Shrinkage in drying is due to the removal of mechanically held water; while burning shrinkage is due to decomposition by the expulsion of chemically combined water, carbon dioxide and sulphur oxides. Clay is completely decomposed when heated to between 500 and 700 deg. C.; a pure clay into free silica and alumina. Clay begins to lose its chemically combined water when heated to between 200 and 250 deg. C. However, most of its water is evolved at a temperature of about 450 deg. C.

Limestone heated to 800 deg. C. completely decomposes into calcium oxide and carbon dioxide gas. The evolution of carbon dioxide commences between 600 and 725 deg. C. The decomposition of the limestone continues until the pressure of the liberated carbon dioxide reaches a definite critical value. Decomposition of limestone is effected rapidly and at a lower temperature by the removal of carbon dioxide as rapidly as formed. When carbon dioxide gas has been driven from the limestone, the residual oxide will rapidly combine with any suitable material present. The presence of an acid, silica or clay, may cause the carbon dioxide to be evolved at a lower temperature than when limestone is heated alone. This is caused by the mutual affinity of calcium oxide and the acid material being greater than that of calcium oxide and carbon dioxide.

The refractory lining of the kiln is of utmost importance. Fire clay lining is apt to prove troublesome by fusing with some of the lime of the raw mix.

The uneven parts of the refractory tend to promote rings having an exposed surface and providing a convenient point about which to start building ring material. Rings often start at butt straps where rivets are located.

The fluxing action between clinker and lining is caused primarily by the clinker, in a liquid state and basic, attacking the refractory, which is not entirely basic but slightly on the acid side. Ordinary firebrick contains a large proportion of silicon dioxide and reacts with the more basic material of the cement mixture, causing partial destruction of the lining in the hotter parts of the kiln and building up rings of sintered material. Fireclay bricks are not basic. Even 70 percent alumina bricks may have short life where the cement mix is made of quite pure limestone and clay or shale. In kilns burning these raw materials, fine raw grinding and very thorough burning must be practiced to produce sound cement.

A raw mix with a high degree of fineness produces rings of a very hard composition which are generally narrow in width and sometimes rising abruptly from the end of the coating. A coarse raw mix forms a long tapering ring of a soft slabby character deposited in very conspicuous layers.

An excess of material low in fluxing value in the raw materials helps to promote rings as a higher burning temperature is necessary for burning suitable clinkers. This will lead to increased action between the magma and coating.

The viscosity of the cement materials at high temperature has an important effect on the rate of clinkering. The viscosity of the magma is a factor in ring formation. Usually a mobile liquid containing a relatively high amount of alkalis will develop ring formation quite readily. A mobile liquid containing alkalis forms liquid more readily and perhaps at a lower temperature than one of a viscous nature. Alkaline silicates are very mobile when fused and readily combine with silica and fireclay. Magnesian and ferrous silicates and aluminum silicates are more viscous than the alkali silicates. The rate of

reaction has a definite influence on the rate of clinker deposit formation.

Clay, shale and coal usually contain varying amounts of sulphur compounds generally as pyrites, sulphates or organic sulphur compounds. Most of these sulphur compounds are decomposed in the burning process. The sulphur is oxidized to sulphur trioxide and appears in the flue dust and is also absorbed by the raw mix near the feed end of the kiln.

Coal Ash

Coal containing 20 percent or more ash forms rings especially if the ash has a low melting point. Coal ash composition consists mainly of silica, alumina and iron oxide. Rings are apt to form when the composition of the ash varies appreciably. When excessive amounts of coal containing a high ash content are used, the ash has a tendency to change the composition of the raw material to such an extent that a ring forming magma is produced. The amount of iron, alumina and sulphur content of coal ash is a leading factor in ring formation.

However, in normal kiln operation, much of the coal ash is carried out of the stack with the gases by the draft. The particles of ash are of the same volume as the particles of coal, yet only one-tenth their weight, for when the coal burns it leaves the ash in the form of a skeleton. These particles of ash are in motion and are in the full draft of the kiln. It seems that most of the ash which contaminates the clinker comes from the impinging of the flame upon the material in the kiln. The ash strikes the clinker and its velocity is stopped by the impact and it either falls among the clinkers or it sticks to the semi-pasty mass.

The fineness of the coal which is burned is an important factor. Coarse coal aids in promoting rings. As a general rule, the amount of ash which contaminates the clinker is in direct proportion to the fineness of the coal used in burning. Coarse coal with its larger and heavier particles is more apt to be caught in the raw materials whose combustion later leaves behind larger amounts of ash. Also, coarse coal will not ignite as readily as finer material and more will be deposited in the cement materials.

The removal of carbonaceous matter contained in raw cement materials and fuel is most readily effected by oxidation, the products of decomposition being carbon dioxide and water. The decomposition occurs most rapidly between 800 and 900 deg. C., although it commences at a much lower temperature.

Laboratory Controls

Obviously some of these causes of clinker ring formation are within the control of the plant chemist who designs the mix; and it is to him the

following observations based on experience are addressed.

A raw mix with a low silica-iron, alumina ratio promotes rings. This mix is hard to burn and would necessitate using excessively higher temperature than normal burning, with resulting excessive amounts of ash in the clinker.

Uneven composition of the mix promotes rings by causing variations in controlling the kiln. The decomposition compounds of the raw materials recombine within fairly definite temperature ranges. In general, as the temperature rises, more calcium oxide is being taken into the reaction. The first formation of liquid occurs in the mass at about 1250 deg. C., at which time the mass undergoes a certain amount of shrinkage. It is thought that tricalcium silicate does not form to any extent until liquid is present in the mix. Any inhomogeneity of the raw mix will tend to increase overlapping of the stages of combination and tend to form ring deposits.

Excessively coarse mix produces rings more readily, especially if it contains large limestone pieces. This condition of the material causes regions of low melting point.

Alumina increases the fluidity of the magma in burning and hence makes the mix more easily burned. However, mix with high alumina content may cause rings as the fusibility of the calcium aluminate compound formed with the calcium oxide of the limestone causes agglomeration and sticking together of the clinker in the hot zone.

Ferric oxide acts as a flux causing the formation of liquid at a reduced temperature. At a comparatively low temperature, a calcium ferrite compound is formed which may cause the formation of ring material. In mixes in which the amount of liquid increases slowly with temperature, the clinkering range may be fairly wide; and in mixes where the rate of increase is rapid, it will be small. High ferric oxide in mix causes rapid increase of liquid. It is thought that ring formation is less apt to occur where the clinkering range is fairly wide.

Usually a mix with a high percentage of silica does not cause rings as easily as one with a low percentage of silica.

A mix having a low calcium oxide content may ring unless it carries with it a high silica ratio. By maintaining the silica comparatively high at the expense of the fluxes, alumina and iron, the liquid formation and reactions proceed in a normal manner. A low lime-silica ratio mix is comparatively easy to burn.

Much of the sulphur compounds, whether present in the raw material as sulphide, sulphate or in combination with organic matter, are ex-

pelled from the kiln and the remainder are all, except a trace, found as calcium sulphate. The raw material, owing to its basic nature, upon entering the kiln tends to absorb the gaseous sulphur compounds produced by the combustion of the coal. The quantity of sulphur compounds in the raw mix increases as it passes down the kiln. As the region of high temperature is approached, the calcium sulphate present is partially decomposed. The sulphur content of the raw mix rises to a maximum and then decreases again. The sulphur trioxide released by this decomposition is absorbed again by the raw mix in the cooler parts of the kiln.

Rings do not form as readily when an oxidizing condition is being maintained in the entire kiln from the front to the back. Reducing conditions in kiln burning may cause the sulphur dioxide or sulphur trioxide to change to sulphur which in turn will cause the mix to become more sticky in the liquid state, hence forming rings.

The finer the raw materials are ground, the lower will be the temperature necessary for burning. When materials are incompletely mixed, the reaction is less complete than if the particles are minute and in close contact. The rate of reaction depends upon the porosity of the reacting mass, as a porous material presents a much larger surface to the reacting substances than if only the exterior surface of the mass is exposed. The relative quantities of the reacting substances exert an influence on the extent to which a reaction will take place. If large quantities are involved, the results may be quite different from that obtained with small quantities.

Since the rate of transfer of heat is proportional to the difference in temperature between the gases and the material to be heated, less time is required for the material to acquire the clinkering temperature when using high kiln temperatures. A coarse ground raw material may be used satisfactorily with high kiln temperatures and not tend to form rings.

(To be continued)

EDITOR'S NOTE: A later article will deal with the effects of kiln design and operation on the formation of clinker rings, also with slurry rings, and with methods of removing and preventing kiln rings of both kinds.

Agstone Quarry Opens

HANSEN & NEUHEISEL, Arcadia, Wis., have opened a new agricultural limestone plant near this city on Oak Ridge. Gerald Neuheisel, part owner of the new plant, was formerly employed by his brother in the Neuheisel Lime Works, Arcadia quarry.

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Dust Collection

Control and Collection of Industrial Dust

Part 8: Froth Type Dust Collectors

By E. D. POWERS

FROTH or foam type dust collectors are a comparatively recent development; their use, however, is spreading very rapidly. As with all wet type collectors the first consideration must be the advisability of collecting the dust in the form of sludge. If that is an advantage, or at least not an objection, they should be considered when very high collection efficiency of fine dust is required.

Primarily, they seem best adapted where a very complete separation of dust from gas is required, and usually when the dust, separated in the form of sludge, is not to be used in the process as in most cases it is contaminated with oil.

The collector shown in Fig. 33 is a self-contained unit. Dust laden gas entering through an inlet duct, passes into an enlarged section called the expansion chamber where some of the larger dust particles are dropped out of suspension into the liquid pool below. The gas then flows through the spray chamber, after which it bubbles up past a liquid seal, and finally through the froth bed. Before leaving the collector the gas strikes impinging baffles where the excess moisture is removed.

The spray is produced either by spray nozzles or a high speed rotor operating at about 1200 r.p.m. If spray nozzles are used, the liquid is not ordinarily recirculated as is the case when using the rotor. The selection is often based on the cost of reasonably clean water, which after using can be run to a sewer, as against the higher power cost for the rotor type equipment. In either case the sludge is de-watered before disposal. A turpentine base oil is usually used as a frothing agent, the froth being produced by the gas bubbling through liquid seals or bells at the top of the machine. The lower edges of the bells are serrated which cause the gas to be broken up into tiny streams producing a violent agitation of the water and frothing of the oil which floats on the surface. The percentage of oil required varies depending upon the nature of the dust. Silica is wetted readily with water while coke or graphite are most easily wetted with oil. Many industrial dusts contain various materials

some of which are best treated with one and some the other. A test will determine the correct ratio of oil to water. Ordinarily the oil requirement will not exceed .001 gal. per 1000 cu. ft. of gas to be cleaned. The water consumption will vary, depending upon the inlet gas temperature. At 100 deg. F. the spray type requires about two gallons per 1000 c.f.m. and the rotor type up to $\frac{3}{4}$ gal. per 1000 c.f.m. At high temperature, additional water will be required.

The resistance through this collector will not exceed 2 in. W.G. Very high gas temperatures can be handled in this collector and it is made up in standard-sized units from 1000 c.f.m. to 50,000 c.f.m. The efficiency is usually stated in fractions of 1 percent less than 100 percent.

The collector illustrated in the Fig.

34 follows the same general idea as the unit just described. In this case the gas enters near the bottom of the collector and passes up through baffles between two pairs of high speed spray producing rollers. A bubble floor near the top is made up of a series of troughs, containing washing liquid. Inverted channel shaped deflectors are placed over the troughs forming a water seal. The lower edges of the channels are notched causing the gas to be divided into many small streams which bubble up through the liquid and form a layer of froth.

The collector shown in the Fig. 35 utilizes a different principle for the second stage of the cleaning operation. The dust laden gas enters a settling chamber when the velocity is reduced, dropping out of suspen-

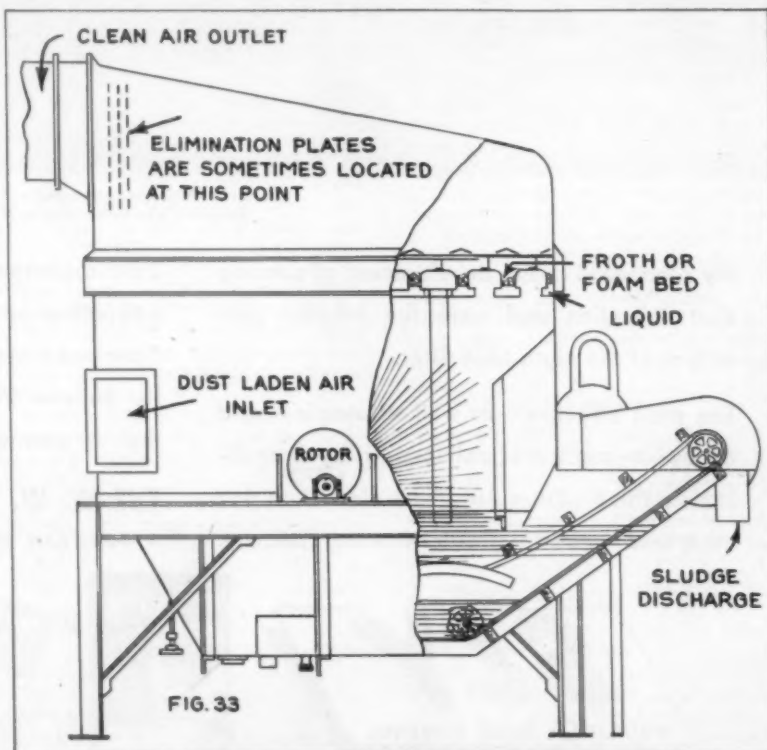
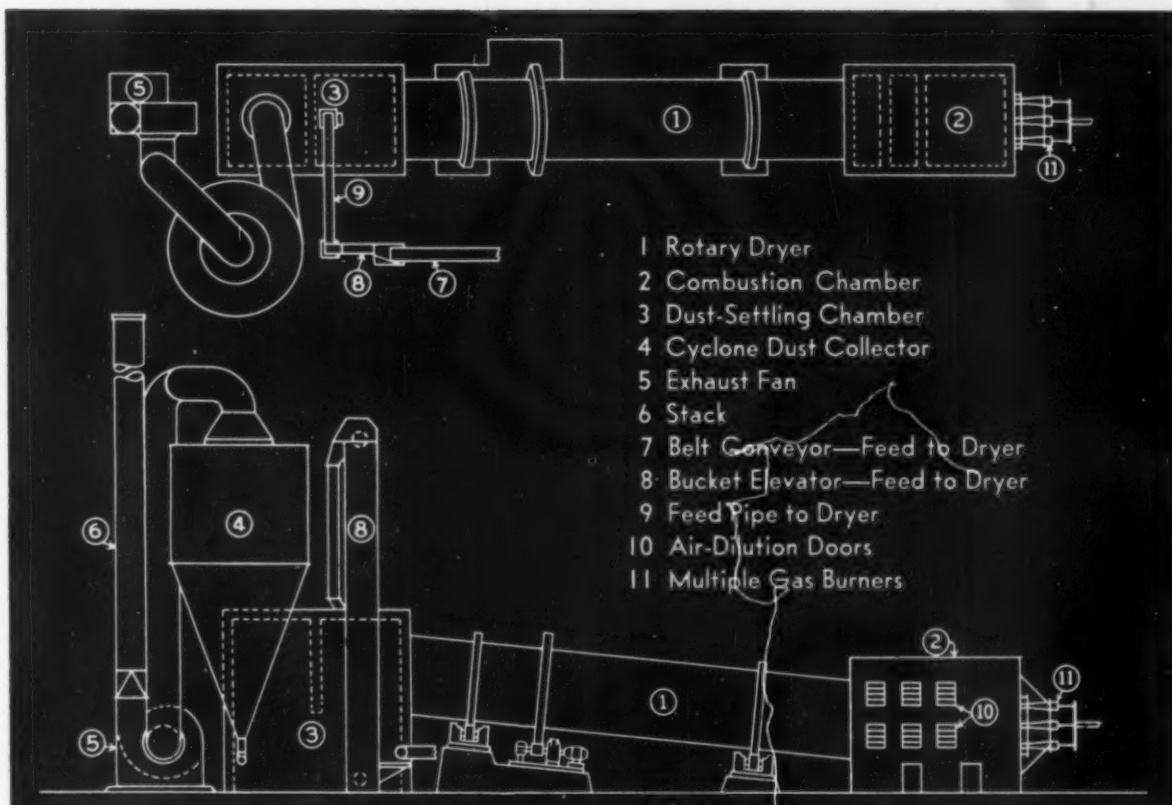


Fig. 33: Self-contained, froth type dust collector



Drying Water-Chilled Blast-Furnace Slag in Mexico

The diagrammatic illustration above shows a complete installation recently furnished to a large Mexican corporation for drying water-chilled blast-furnace slag, preparatory to its use in the manufacture of cement. Outstanding features include provision for delivering a large volume of hot gases to the dryer at relatively moderate temperature—which can be controlled within narrow limits—also for collecting and reclaiming the dust. Other carefully engineered features assure minimum operating expense; especially with respect to flow of material to and from the dryer.

Although unusually well equipped with foundry, fabricating and machining facilities for building rotary kilns, coolers, dryers, calciners, etc., of all

types and sizes, "Vulcan" is primarily an engineering organization; prepared to assume full responsibility for designing complete installations to meet specific requirements. When building to specifications furnished by other engineering organizations, our long experience often permits checking new designs against installations previously furnished for comparable service elsewhere and thereby making suggestions which lead to higher operating efficiencies and correspondingly lower manufacturing costs.

Correspondence regarding the drying, cooling, or calcining of any inorganic material is cordially invited. Estimates, constructive suggestions and preliminary designs will be furnished, so far as possible, without charge or obligation.

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Rotary Kilns, Coolers and Dryers
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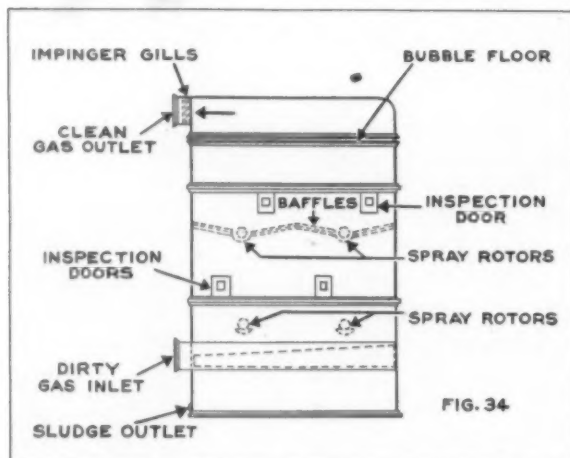


FIG. 34

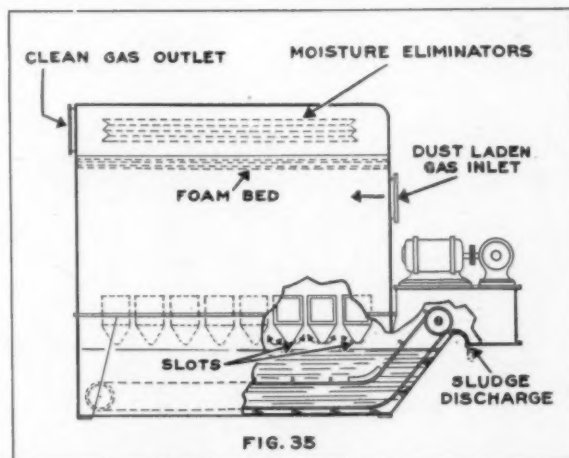


FIG. 35

Fig. 34: Another froth type collector in which the gas enters at the bottom and passes through baffles between two pairs of spray producing rotors. Fig. 35: Two-stage froth type dust collector

sion the coarser dust particles. It then enters a second stage through a series of tunnels where the velocity is increased. The gas leaves the tunnels through long horizontal slots about 1 in. wide located about ½ in. above the surface of the liquid at a velocity of about 4000 ft. per minute. As it strikes the liquid surface, much of the dust is trapped due to the low surface tension of water which has been treated with a wetting agent, used in a ratio of about 7 parts per 10,000. It then passes through a

layer of froth where the finer particles are caught. Excess moisture in the outgoing cleaned gas is also separated in this unit by the use of baffle or eliminator plates.

In general it might be said that these follow the general limitations of wet collectors in application and are best suited when a high collection efficiency of a fine dust is required. Usually the contamination of dust by water and oil prevents its reuse.

struction projects to offset local unemployment conditions resulting from cancellations but no general upsurge of demand nor widespread release of postwar projects for some time. By the end of the year, improvement in operating conditions should be considerable but no great increase in sales volume may be expected until middle of 1946 at the earliest. Believe V-E already discounted but from purely business standpoint, unexpected early end of Jap war might hurt more than help."

Lime

Lime plants generally are operating to capacity, and cannot increase production until more labor becomes available. ROBERT B. CROTHERS, M. J. Grove Lime Co., Frederick, Md., sees no immediate effect of V-E Day on operations. "W.P.B. has been very cooperative in priority matters concerning supplies, repairs and maintenance," he reports, "but delivery equipment situation is critical due to manpower shortage and inability to replace worn out trucks, etc. Heavy items, such as shovels and hauling equipment, needs replacement. Manpower situation is serious in this section and I see no immediate prospect of any substantial improvement for at least six to eight months. A heavy backlog of business awaits relaxation of restrictions on municipal and private construction, but until manpower situation improves and present controls are removed, I see no point in relaxing restrictions on construction. Mechanization of plants has been in progress during the war and will be accelerated as additional equipment becomes available."

HOMER H. DUNLAP of St. Clair Lime Co., Oklahoma City, Okla., advises that European victory and subsequent cutback in munitions output should aid lime situation which has been critical. National chemical lime shortages of approximately 1500 tons

(Continued on page 96)

Victory in Europe

(Continued from page 75)

struction material by the W.P.B.," he said, "will no doubt become effective immediately. The real key, however, to immediate resumption of private and public construction is manpower. It is my opinion that this will be only partially relieved with victory in Europe and not complete until total victory. The State of South Carolina has plans and preliminary work done on about \$18,000,000 in road and bridge construction. Contracts for starting on these projects will be let just as soon as labor is available. The crushed stone industry in this state is ready. Similar conditions nationally probably prevail."

A large Tennessee crushed stone company, in answer to the telegram, reports it will make a considerable "investment in equipment to improve present plants and reopen one plant, now shut down due to labor and equipment shortages, provided of course manpower situation very much improves."

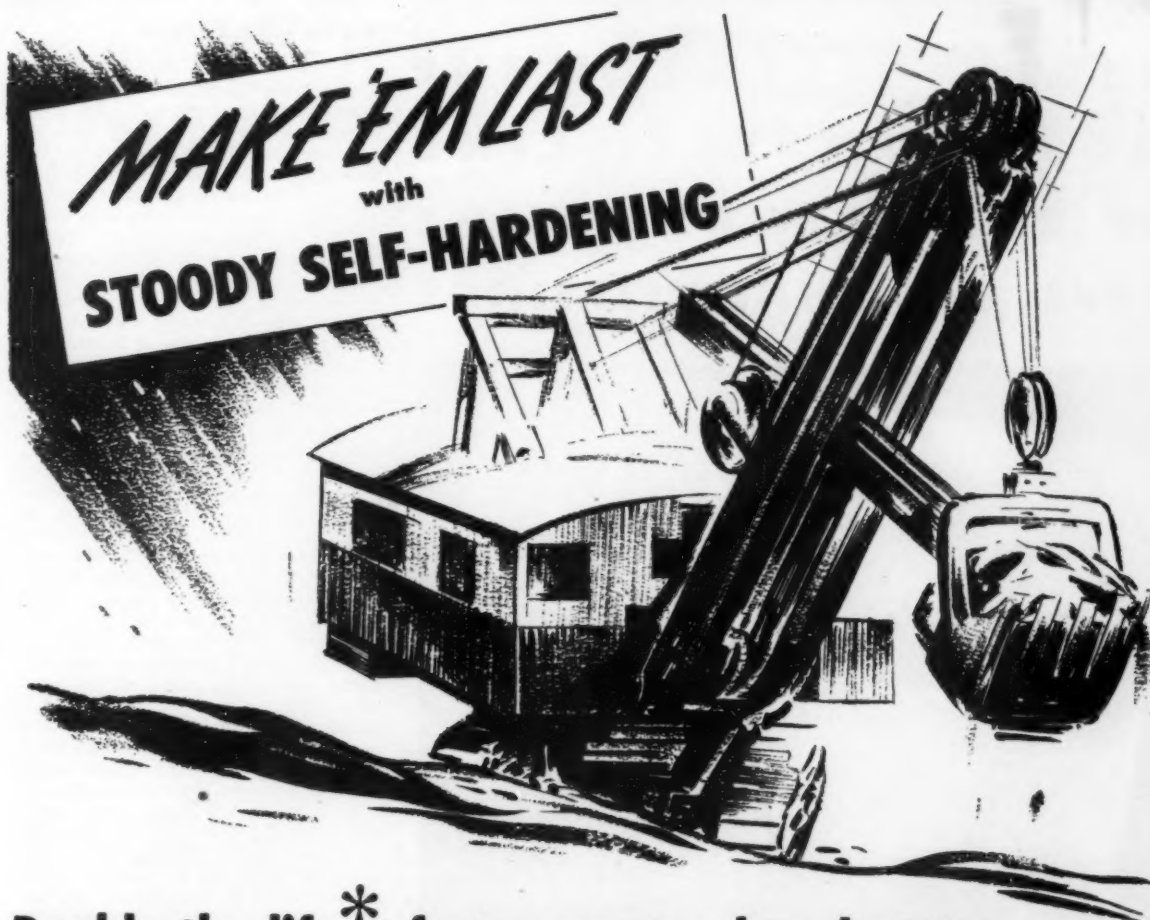
KENTUCKY STONE CO., Louisville, Ky., advises that victory in Europe will result in the release of a long planned highway construction program in Kentucky due to return of a great many men who will need em-

ployment promptly. Reduced requirements for military materials should make civilian construction material available. Heavy haulage of rehabilitation items by rail will create a demand for ballast. Several good years for the industry are foreseen. Tires and trucks are the most critical items in Kentucky at present. Agricultural limestone demand remains good but haulage facilities are critical.

JOHN N. ODENBACH of Dolomite Products Co., Inc., Rochester, N. Y., wires as follows: "The war is only half over and we do not expect or look for any immediate effect on our crushed stone business nor on the industry nationally until after the cessation of hostilities in the Pacific. Volume in the crushed stone industry is dependent on a large proposed highway construction program, but this can only come as a postwar activity. Most highway materials, with possible exception of steel, are now on the non-critical lists, but labor is the short item and there can be no appreciable supply of labor diverted to construction until after our final victory."

H. V. OWENS of Eastern Rock Products, Inc., Utica, N. Y., "expects a gradual easing of labor and materials restrictions, and release of con-

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STOODY SELF-HARDENING



Double the life* of your power shovel parts with this economical hard-facing alloy

LIFE of all wearing power shovel parts—and your other earth-working equipment too—can be improved with Stooddy Self-Hardening, a special hard-facing alloy that has twice the wear resistance of manganese steel with toughness to take severe punishment without chipping.

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Stooddy Self-Hardening is easy to apply, bonds well with manganese steel, provides substantial life increases to all shovel parts such as bucket parts, track pads, rollers, idlers, drive tumblers, etc.

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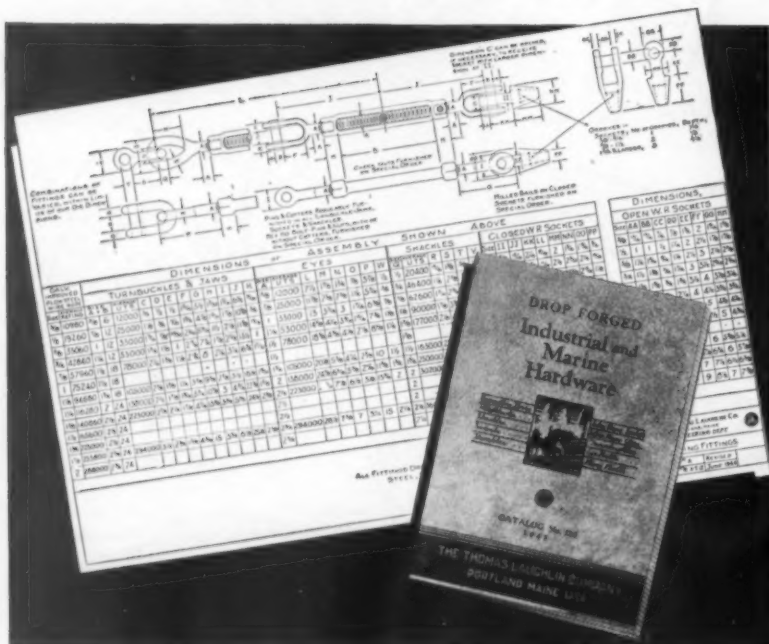
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NEW CATALOG ON THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



NEW ITEMS...NEW ENGINEERING DATA SIMPLIFY SELECTION OF THE RIGHT FITTINGS

To simplify your job of selecting the right combination of fittings for any wire rope or chain assembly... Laughlin's new Industrial and Marine Hardware Catalog No. 135 is now ready.

This catalog displays every item in the most complete line of drop-forged wire rope and chain fittings on the market. New items have been added since the last catalog was published — and your nearby mill, mine or oil field supply house is taking orders for them.

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LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



Victory in Europe

(Continued from page 94)

daily should be relieved by Autumn. Lime industry will have adequate production for all building as soon as other materials are available. We anticipate little change in method of operation at plant, but any increase in production costs, especially from labor, will cause unprofitable operation in many plants. We anticipate that some industries, such as paper whose operations are now curtailed due to labor deficiency, will increase production with relocated labor. This increase in use of our product will take up some slack caused by war contract cancellations."

RALPH L. DICKEY of The Kelley Island Lime and Transport Co., Cleveland, Ohio, advises, "Until more manpower is available to operate present idle capacity, relaxation of building restrictions will have little effect on our business. We are now producing and shipping every ton of material possible with present force, and believe rest of industry in our area is in same situation. Building, chemical and agricultural lime demand is now in excess of industry production, and any increase in demand which would result from relaxation of building restrictions could not be supplied unless sufficient manpower became available."

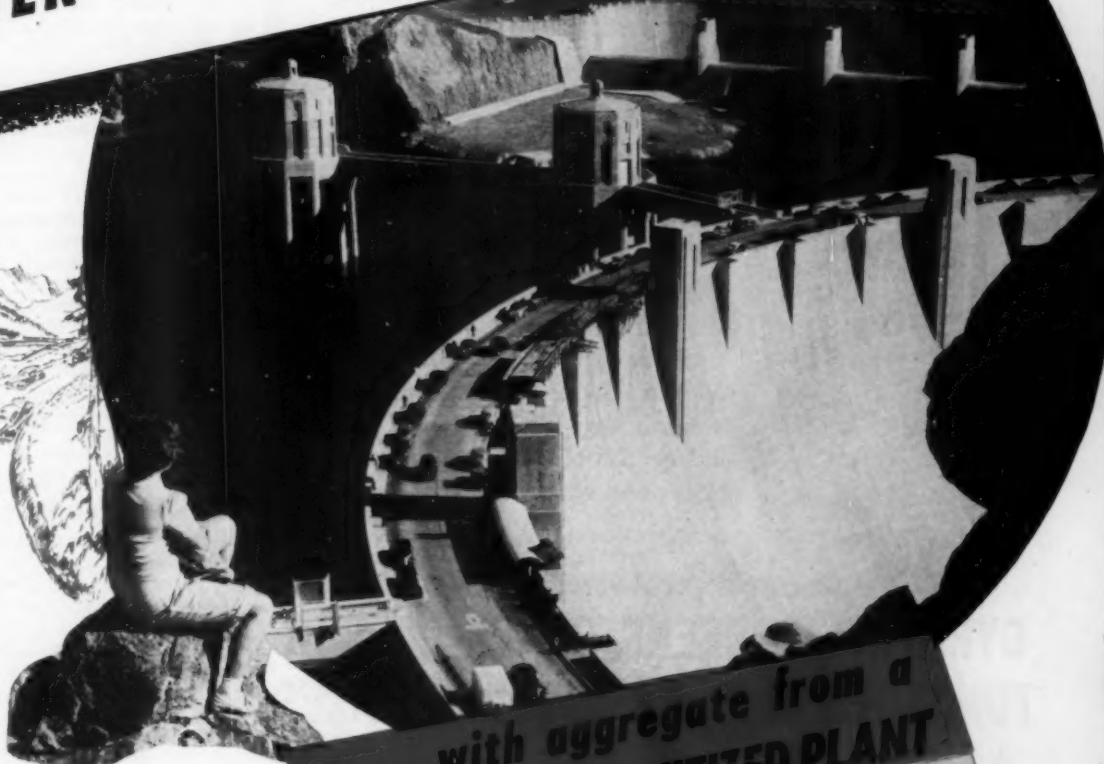
E. I. WILLIAMS of Riverton Lime and Stone Co., Riverton, Va., reports, "I do not believe the European victory will have any immediate effect on our company operations as we are in a very tight labor area with about half the employees we had in 1941, and see no possibility of substantial increase in labor soon. Winning the Japanese war is of course the first job to be done, and with the present shortage of labor, lumber, brick, etc., I do not see how there can be much increase in building construction until conditions ease materially. Then as restrictions are removed and labor becomes more plentiful, we look forward to good business locally and nationally."

PHILIP L. CORSON of G. and W. H. Corson, Inc., Plymouth Meeting, Penn., sees no immediate effect on his business. "We are operating at capacity and believe we will continue to do so during the remainder of 1945. No restrictions have been relaxed as yet, and we do not look for much change during the next three months. After that time we believe there will be less critical manpower and material conditions as far as the industry itself is concerned. We believe that most lime manufacturers will continue to operate at capacity."

L. T. McCourt of Fischer Lime and Cement Co., Memphis, Tenn., reports that "V-E Day has greatly stimulated the urge to build industrial, commercial and residential buildings of all types. In our opinion, building restrictions should not be hastily lifted."

(Continued on page 98)

BUILD BETTER Dams



... with aggregate from a
CEDARAPIDS UNITIZED PLANT

On those big jobs where tonnage of aggregates runs into the hundreds of thousands, the difference of a few cents per ton in production cost may mean profit or loss to the contractor. That's where the big Cedarapids Unitized Plant with its high capacity and low operating costs pay big dividends.

This super crushing plant handles material in a continuous flow from quarried rock to delivery trucks at the rate of 150 to 200 tons per hour. The big primary with its 1000 sq. in. jaw opening sets the pace for the entire plant taking the biggest rock with ease. A smaller jaw crusher and roll crusher in the secondary unit then reduce the oversize to the wide range of sizes to meet all aggregate specifications. Each unit is mounted on a pneumatic-tired truck ready to attach to a tractor. Costly dismantling and erecting time have been eliminated so idle time is kept to the minimum.

Get ready for those BIG postwar jobs now. With a Cedarapids Unitized Plant to produce the aggregate at lowest cost you'll be sure of getting your share.

IOWA MANUFACTURING CO.
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THE IOWA LINE of Material Handling

Equipment Includes

ROCK AND GRAVEL CRUSHERS	PORTABLE POWER CONVEYORS	TRAVELING (ROAD MIX) PLANTS
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STRAIGHT LINE ROCK AND GRAVEL PLANTS		KUBIT IMPACT BREAKERS
FEEDERS—TRAPS		

*Talk About
Concentrated
Screening
Force!*

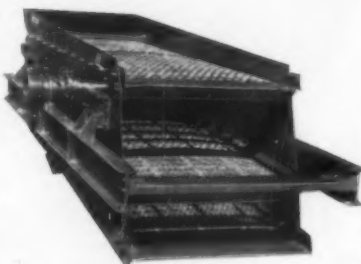
Simplicity

On Simplicity Gyrating Screens all force is concentrated directly across the screen surfaces. The counter-balance is machined directly on the shaft, and it exactly balances the weight of the entire vibrating screen deck assembly. In this way it "builds up" positive action across the screen surfaces with perfect smoothness. This is one of the many Simplicity reasons for improved screening.

GYRATING SCREENS GRADE LARGER TONNAGES IN MORE ACCURATE SIZES

Consider your separation in terms of screen capacity, screen life, and the grade of material separated and you will always find Simplicity Gyrating Screens on top in the long run.

Your own screening problem may fit into one of the hundreds solved with complete satisfaction by the army of Simplicity users. And if it is something of an extra special nature, the broad experience of Simplicity Engineers can be relied upon to produce an answer that will give you both quality and economy in operation.



A 5' x 12' Model D Triple Deck Simplicity Gyrating Screen

ENGINEERING COMPANY, DURAND, MICH.

Simplicity

Equipment, materials and lumber manufacturers should be allocated labor and materials, and until their products are available, building restrictions should at the most only be eased. To lift building restrictions now before materials are available will cause untold confusion. Roofing, brick, lumber, insulation board and many other items are still critical and should be available before the green light is given on building. Hundreds of projects are ready here, only a few of which could be built if restrictions are removed in advance of availability of materials."

FRANK WITMER of The Ohio Hydrate & Supply Co., Woodville, Ohio, points out in his reply that the building industry was one of the first to be restricted at the beginning of the war. "It should therefore be one of the first to be permitted unrestricted material and labor to provide jobs so that at the close of the war, unemployment will be reduced to a minimum," he said. "The prospects of our business have become brighter as we approach the end of the war."

Industrial Sand

G. A. THORNTON, Ottawa Silica Co., Ottawa, Ill., commenting on the industrial sand situation, said, "We have already noticed some cutbacks on shipments of silica sand, principally to magnesium, aluminum, and steel foundries. Our glass tonnage has in no way been affected. We are hopeful that relaxation of war manpower control will enable our company to secure additional employees which has seriously crippled our operation. Box car shortages likewise have been a factor that has handicapped our operation and at present this condition seems to be somewhat improved."

(Continue Concrete Products and Ready Mix reports on page 132)

National Gypsum Plans

FURTHER INFORMATION on National Gypsum Company's post-war plans has been released. These plans call for an overall increase in capacity of 25 percent. As previously announced, a new Baltimore, Md., gypsum board plant will replace the Akron, Ohio, facilities. The gypsum at Akron will be mined out next year. A new lime plant will be built at the recently acquired Kerns, Va., property. Extensions have been planned for the company's southern gypsum board plants at Savannah, Mobile, and Rotan which will increase board production for the South and Southwest by about one-third. New equipment purchases are contemplated to increase production.

Buys Stone Concern

L. A. BALDWIN, Hartford, Conn., has purchased The Gailor Stone Co., Saratoga Springs, N. Y. Mr. Baldwin advises that plans are under way to reequip the quarry and plant.

For Dust Recovery

Look at the multiple advantages
you get in the MULTICLONE!

Not in just one or two ways...

but on every important feature!

MORE COMPACT!

Whether for installation in a new plant or existing structures, the unusual compactness of the MULTICLONE pays important dividends. Note below the MULTICLONE space savings compared with other leading space recovery equipment (all figures based on comparable performance)...

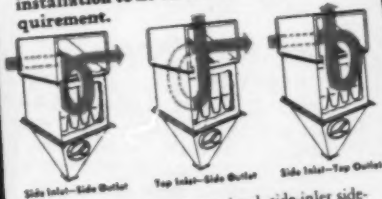
SPACE REQUIREMENTS OF COMPARABLE RECOVERY UNITS

Make	Relative Space Requirements	
	In Sq. Ft.	In Cu. Ft.
Multiclone	1.0	1.0
Collector A	2.1	1.8
Collector B	5.9	3.2
Collector C	6.8	3.9

The MULTICLONE in some cases saves as much as six times the floor space, almost four times the cubic space of comparable units. Translate these savings into valuable building area and space availability in your plant and you'll see how important this MULTICLONE feature is!

GREATER ADAPTABILITY!

By eliminating complicated multiple manifolding, the simple inlet and outlet advantages of the MULTICLONE permit installation to fit virtually any plant requirement.



Where headroom is restricted, side-inlet side-outlet installations can be used. Or where side clearance is restricted, side-inlet top-outlet or top-inlet side-outlet installations can be made with the MULTICLONE. This feature, combined with the MULTICLONE compactness, permits easy installation in even waste spaces of existing plants... spaces far too small for ordinary recovery units.

HIGHER RECOVERY!

It's an engineering fact that the separating efficiency of a cyclonic tube increases as the tube diameter decreases, because the smaller the radius the greater the centrifugal forces to throw out extremely fine as well as coarse particles.



(Above) How vane guides gases in tube
(Below) Vane distributes gas uniformly

But the complicated manifolding of conventional side entry cyclones limits use of small tubes, whereas in the MULTICLONE the patented vane—an exclusive feature—permits compacting many small-diameter tubes into one simple, highly efficient unit.

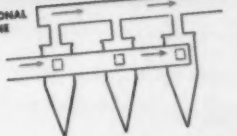
This is why the MULTICLONE collects not only the coarser particles, but also an unusually high percentage of the extremely fine particles of 10 microns and less!

SIMPLER TO INSTALL!

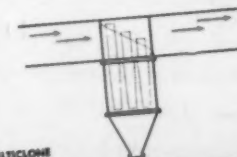
Conventional side-entry cyclones require complicated manifolding of inlet and outlet ducts, are space-wasting and costly to install, expensive to insulate. Individual hoppers add further complications.

But the MULTICLONE, because of the patented vane that guides the gases in each tube, requires only a single inlet and single outlet header to service an entire bank of tubes. Simple, inexpensive, easy to insulate. Further, one hopper serves many tubes. Less maintenance, easier servicing!

CONVENTIONAL CYCLONE



MULTICLONE



advantages that mean greater efficiency, less maintenance, lower

overall cost on your dust recovery installation. However these are just a few of many vital advantages incorporated in MULTICLONE equipment. Before you install any recovery equipment it will pay you to get the complete story on MULTICLONE collectors. A wire, letter or phone call will place an experienced engineer at your service!

Send for this booklet which gives additional MULTICLONE advantages!



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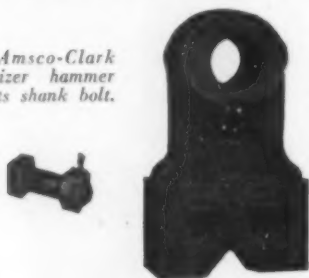
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Shank Bolt of This Pulverizer Hammer Takes No Operating Stress

The bolt which holds the assembly together could be a weak point in the design of a multiple-part pulverizer hammer. If subjected to operating stresses, the bolt would sooner or later fail, loosening the

S-14 Amsco-Clark pulverizer hammer and its shank bolt.



shanks and releasing the hammer head, with resultant damage to the machine and time lost for replacement.

This possibility has been obviated in the design of the Amsco-Clark renewable tip pulverizer hammer, the assembly and bolt arrangement of which are shown in Fig. 5. No stress is imposed on the shank bolt during operation. The two shank halves of tough manganese steel, the claws of which engage internal pockets in the head as pictured, take the operating stresses. Even if the bolt in this hammer should become loose or drop out, the assembly would hold together and the head could not fly off as long as the shank was on the supporting rotor pin.

Other important advantages are embodied in the Amsco-Clark design (patent pending.) Two-thirds of the hammer tip is actually used before it need be replaced. The time required for replacing tips is negligible, as the shanks are easily disengaged from a worn head. There is no guessing when to change heads because the shank-protecting metal is always visible.

Supplementing these design features, the incomparable durability of austenitic manganese steel in crushing service assures a pulverizer hammer equal to the heaviest service.

Price inquiries can be answered promptly if you will give the make of your pulverizer and the pattern number of your present hammers.

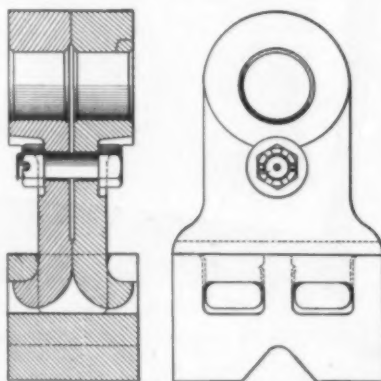


Fig 5 Detail of Amsco-Clark 3-part pulverizer hammer (patent applied for).

Bulletin 844D describes the application of manganese steel to all types of dredges.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN
Brake Shoe
COMPANY

Registration at Chicago Meeting

(Continued from page 85)

Robert Mitchell, Consolidated Rock Products Co., Los Angeles, Calif.
M. A. Neville, Western Indiana Gravel Co., Lafayette, Ind.
Bror Nordberg, Rock Products, Chicago, Ill.
Edward J. Nunan, Buffalo Slag Co., Buffalo, N. Y.
H. F. Garvin Felsue, Metropolitan Sand and Gravel Corp., New York, N. Y.
H. C. Peters, T. L. Smith Company, Milwaukee, Wis.
Stanley A. Phillips, Pit and Quarry, Chicago, Ill.
T. E. Popplewell, Fort Worth Sand and Gravel Co., Inc., Fort Worth, Texas.
Robert F. Porter, H. T. Campbell Sons Corp., Towson, Md.
Lester Prange, Tews Lime and Cement Co., Milwaukee, Wis.
John Prince, Stewart Sand and Material Co., Kansas City, Mo.
G. W. Renwick, Chicago Gravel Co., Chicago, Ill.
O. R. Rideout, Boston Sand and Gravel Co., Boston, Mass.
N. C. Rockwood, Rock Products, Chicago, Ill.
Joseph M. Scheinin, James A. Norton, Inc., New York, N. Y.
Charles W. Shirey, C. W. Shirey, Waterloo, Iowa.
F. P. Spratlen, Jr., Spratlen-MacDougall, Inc., Denver, Colo.
Stephen Stepanian, The Arrow Sand and Gravel Co., Columbus, Ohio.
C. M. Stumpf, McGrath Sand and Gravel Co., Lincoln, Ill.
E. Guy Sutton, Neal Gravel Co., Mattoon, Ill.
H. F. Thomson, General Material Co., St. Louis, Mo.
Stanton Walker, National Sand and Gravel Assn., National Ready-Mixed Concrete Assn., Washington, D. C.
Julius J. Warner, Richter Concrete Corp., Cincinnati, Ohio.
R. E. Weaver, Lincoln Sand and Gravel Co., Lincoln, Ill.
Ernest W. Willert, Tews Lime and Cement Co., Milwaukee, Wis.
W. H. Wyckoff, Merom Gravel Co., Indianapolis, Ind.

Lime As a Wood Preservative

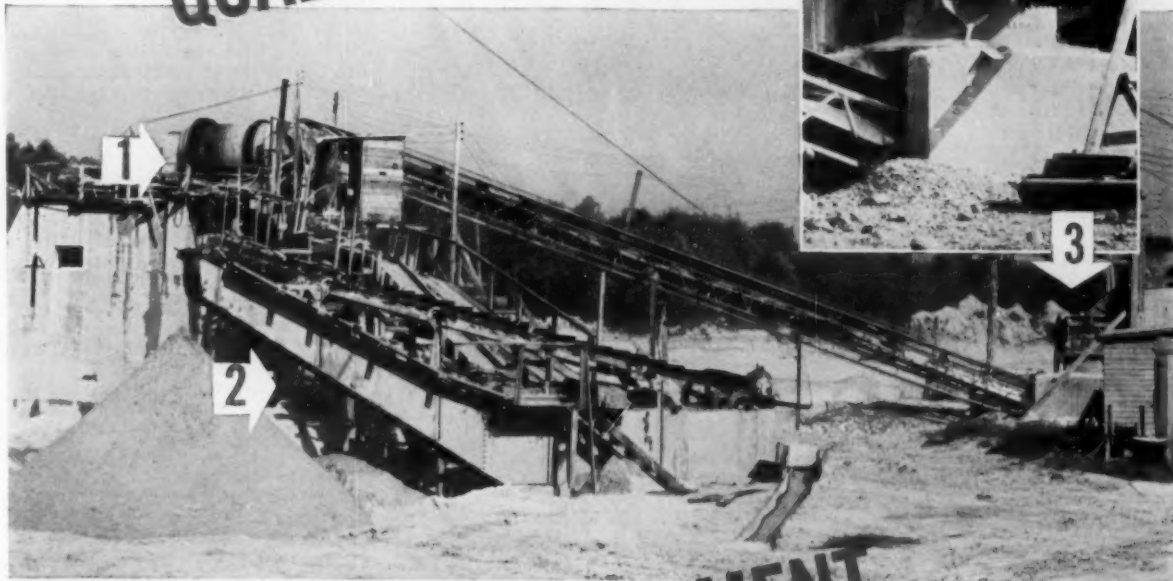
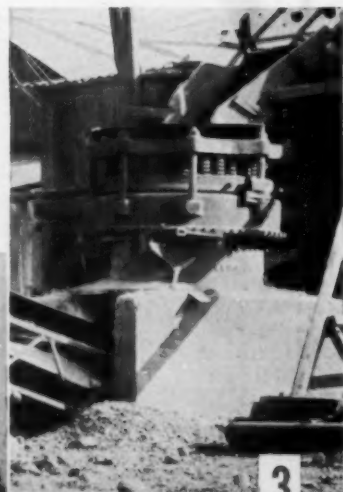
THE NATIONAL LIME ASSOCIATION has pointed out that lime may be used as a preservative of wood. Prof. Green of Minnesota University has claimed that, next to asphalt, lime was the best preservative of wood. He cited instances where old wood shingles on houses built in pioneer days had been preserved by the lime water that ran down from chimneys built of lime mortar all around the chimneys, whereas the shingles on other parts of the roofs had rotted long before.

Pavement Yardage

AWARDS of concrete pavement for April, 1945, have been announced by the Portland Cement Association as follows:

	SQUARE YARDS AWARDED	
	During April, 1945	During 1st Four Months, 1945
Roads	117,741	908,678
Streets and Alleys.....	396,866	855,205
Airports	252,320	1,964,831
Total	766,927	3,728,714

HIGH OUTPUT... QUALITY PRODUCT



- 1 Tel-smith Super Scrubber
- 2 Tel-smith Sand Drag
- 3 Tel-smith Gyrasphere Crusher

LOW INVESTMENT

G-13

● Right from the start the Northern Virginia Construction Co. has been getting consistently high output from its Annandale, Va. plant. And the exceptionally clean and well graded sand and gravel this modern 100 to 125 ton-per-hour plant produces, finds a ready and profitable market. All its major equipment is Tel-smith.

With the occasional 5" boulders scalped out, other material over top finished size goes to the 36" Tel-smith Gyrasphere Crusher. Working at choke feed this unit turns out top tonnage with less power and less upkeep. The Tel-smith 60" Super Scrubber... a high-speed ball mill type scrubber... processes thoroughly and separates sand and gravel. A No. 6 Tel-smith Sand Tank makes concrete

sand. Overflow flumed to a 60" x 30' Tel-smith Sand Drag produces mason sand. This plant also has a 24" x 5' Tel-smith Plate Feeder; 24" x 45' and 24" x 90' Tel-smith B-G Conveyors.

In this well-balanced plant Tel-smith capacity, flexibility and economy combine with low investment cost to produce a good margin of profit. That's why this operator's other two plants have Tel-smith equipment. *Get Bulletin G-11.*

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Rish Equipment Co.
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Cambridge 42, Mass.

Boeck Ept. Co.
North Carolina Ept. Co.
Raleigh & Charlotte 1, N.C.

Mines Eng. & Equip. Co.
San Francisco 4—Los Angeles 14
Wilson-Weemer-Wilkinson Co.
Knoxville 8 & Nashville 6, Tenn.



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now!**

In making your post-war plans, you'll want to install the light-weight pipe that can give you the stepped-up performance required for more profitable operation.

No other light-weight pipe combines all the advantages of Naylor's exclusive Lockseam Spiralweld structure. You'll like its light weight. Its greater strength. Its speed of installation. Its leaktightness. Its extra safety. Its revolutionary coupling methods. Its savings, high salvage and re-use value. It will pay you to do your mental shopping now and include Naylor Pipe in your post-war plans.

Specify Naylor Pipe for high pressure hydraulic lines, high or low pressure air and water lines, de-watering, drainage, ventilating and sludge lines. Sizes from 4" to 30" in diameter, lengths up to 40 feet. All types of fittings, connections and fabrications.

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SPIRALWELD PIPE**

NAYLOR PIPE COMPANY

1237 EAST 92nd STREET, CHICAGO 19, ILL.

New York Office:

350 Madison Ave., New York 17, N. Y.

Sand Separation

(Continued from page 87)

may consult needs all the information he can obtain about the characteristics of the material you wish to screen. There are many considerations the average operator may not think of. High efficiency in separation may not always be the goal. For example, in the case of the Connecticut problem we have been describing in so much detail, the same result could be effected by inefficient screening of the whole plant output as by efficient screening of the 40 percent in order to recover and use only the plus 16-mesh with the other unscreened 60 percent (see the article in the February issue, pp. 57 and 104).

Our friend, A. E. CONOVER, of Robbins Conveyors, Inc., explains it thus: "There are two different ways to do this job:

"(1) Feed the total tonnage to a screen and operate at so low an efficiency that only 40 percent of the undersize will pass through.

"(2) Feed only 40 percent of the total tonnage to a screen and remove all of the undersize from this fraction.

"In the first case the feed would be 50 cu. yd. per hr. containing 41.5 cu. yd. per hr. (83 percent) of undersize, of which 40 percent, or 16.6 cu. yd. per hr., is to pass through. In the second case the feed would be 20 cu. yd. per hr., of which all the undersize or 16.6 cu. yd. per hr. is to pass through. Since the tonnage of throughs is the same in either case, you might say the same size screen would be needed in both operations. Actually, taking into account all the factors that must be considered, you will realize that less than half the screen area will be needed for operation (1) as in the case of operation (2).

Mr. Conover concludes: "The fundamental objection to operation (1) which would probably make operation (2) preferable, regardless of the greater screen area required, is the question of control. We can visualize a great deal of difficulty in maintaining the necessary low level of 40 percent screening efficiency, consistently. On the other hand it would be relatively easy to cut 40 percent from the total feed and maintain a uniform high efficiency on the screen."

It was the No. 2 operation that has already been so thoroughly discussed in previous articles. The No. 1 operation is described here because it suggests that the solution of maintaining a 40 percent efficiency might be solved by control of the moisture content of the feed, so as to reverse the usual objective, and make it difficult for the oversize to rid itself of the clinging undersize. In other words, you don't want to shake or wash off all the fines, but only 40 percent of them.

Speed and Simplicity **CUT HAULING COSTS**



Rugged simplicity, always the basis of Euclid design, helps to keep hauling costs down because there is a minimum of wearing parts. Built to do one specific job... off-the-highway hauling of earth, ore, rock and coal... Rear-Dump and Bottom-Dump EUCLIDS cost less to own and operate.

With top speeds of 21.8 to 34.4 m.p.h.... carrying 15 to 30 ton payloads... Euclids move more yards or tons per day on both short and long hauls. For dependable, low-cost hauling on the toughest jobs... in mines, quarries, construction work and industrial material handling... rely on Euclid simplicity and hauling speed coupled with efficient digging and loading equipment.

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CLEVELAND 17, OHIO

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**SELF-POWERED
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For EARTH ROCK COAL ORE



CINCINNATI

Conveyor Belts carry **BIG TONNAGE**
give . . . **LOW BELT COST** per ton



Those two factors account for the ever increasing demand for Cincinnati Conveyor Belts by operators of Sand, Gravel and Rock Crushing Plants as well as conveying equipment manufacturers. Buy "Cincinnati" Belts to convey any kind of material efficiently.

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made to meet the needs of ROCK PRODUCTS OPERATORS

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- Internally lubricated
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Ready Mix Design

(Continued from page 79)

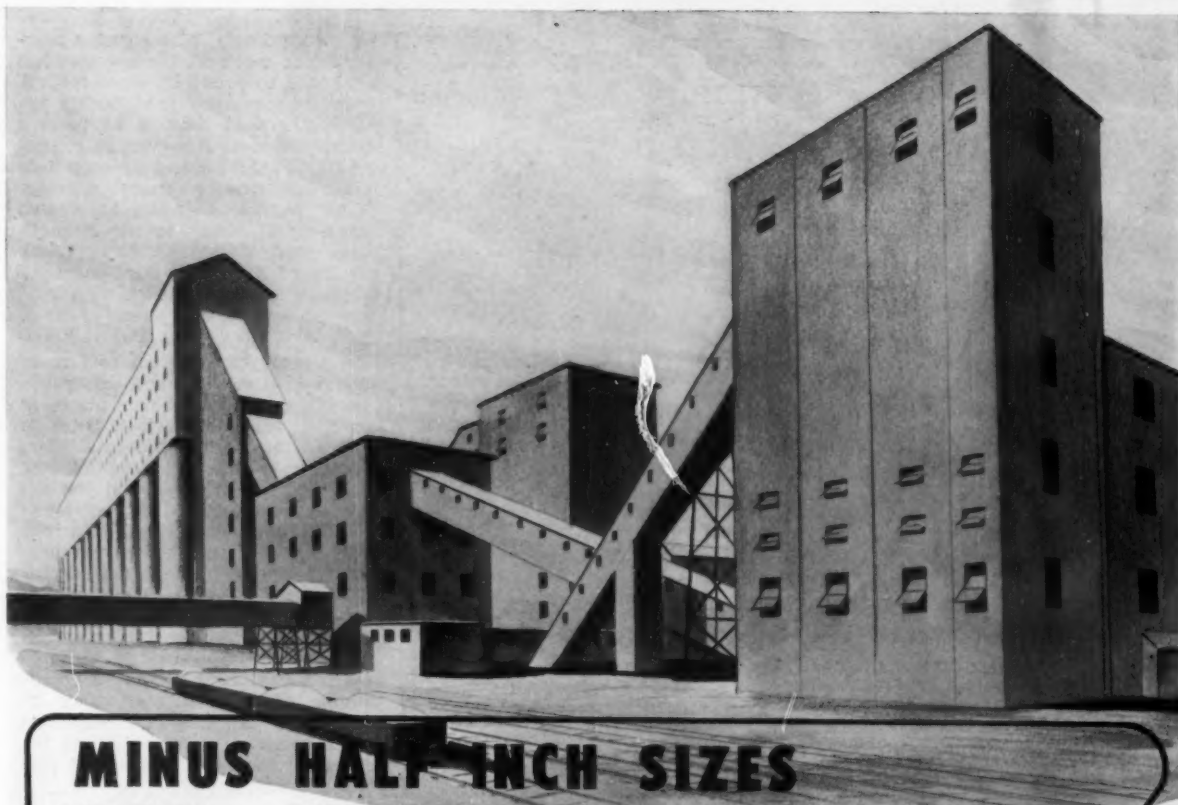
cision as outlined above. The job check should be made by preparing test cylinders from the concrete as delivered to the job, with curing and testing under standard conditions. The contractor may desire to know the strength of his concrete as placed in final position in the structure, and to determine this may wish cylinders cured under job conditions. These values should not, however, be considered a check on the design curve, as job conditions are beyond the scope and control of the ready mixed concrete operator.

The cement/water ratio-strength relationship, as shown most easily in the form of a curve, is vital to the successful operation of a concrete construction job, of a ready mixed plant, or of a concrete products factory. It is the most basic relationship in the manufacture of concrete for practically all uses. Not all specifications are on a strength basis. Many require a definite cement factor, pounds or bags for cubic yard of concrete. Others may require a certain cement/water ratio. All, however, aim at given quality in the concrete, and this is most easily measured in terms of strength. Also, in many cases the ready mixed plant operator is considered to be an expert in concrete and its uses, and concrete is ordered for a certain use, leaving it up to the operator to supply the most suitable mix. This places an added but entirely reasonable and justifiable responsibility on the plant management. Unless the strengths of the various mixes are known within close limits, an intelligent job cannot be done.

"Over-Design" Causes Waste

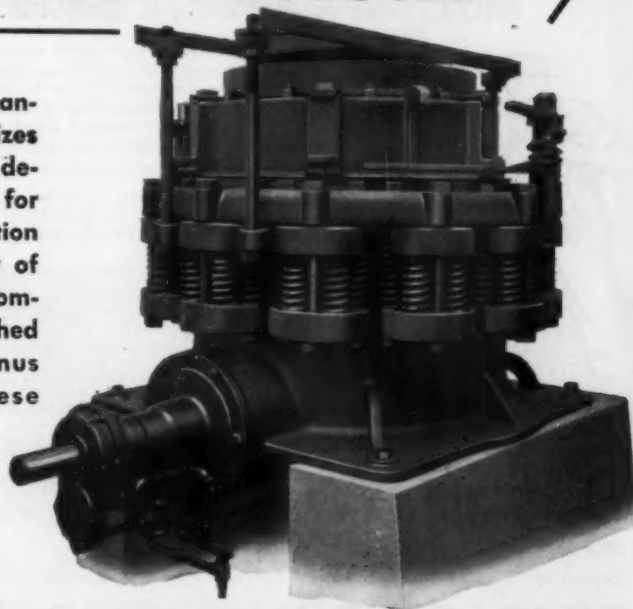
One of the main causes of waste in concrete is over-design. A generous factor of safety, usually from four to six, is used in the design of concrete members. For example, if the compressive strength of concrete in the structure is assumed at 650 p.s.i., concrete with a compressive strength under standard tests of 3000 p.s.i. may be specified. It is then entirely unnecessary and extremely wasteful to supply concrete for such a structure with compressive strengths of 3500, 4000, and even higher, as is often done. Such concrete wastes cement and also causes increase in volume change with consequent increase in cracking. The efficiently managed plant will so control its operations that the concrete delivered will be of the required quality and very little more. Most city building codes require a margin of 15 percent between the actual test strength curves and the curves used for design. Under these conditions the only thing the operator can do is to be sure that his strength curve is correct and

(Continued on page 106)



MINUS HALF INCH SIZES MORE ECONOMICALLY PRODUCED

If your present crushing equipment cannot economically produce those finer sizes for which there is an ever increasing demand, now is the time to make plans for modernizing your plant by the installation of Symons Cone Crushers. A survey of users of Symons Cones reveals that prominent and progressive producers of crushed materials invariably make their minus half inch sizes with Cones. These major producers appreciate the advantages of big capacity of fine product and low cost crushing which have won for Symons Cones a foremost place among crushing machinery.



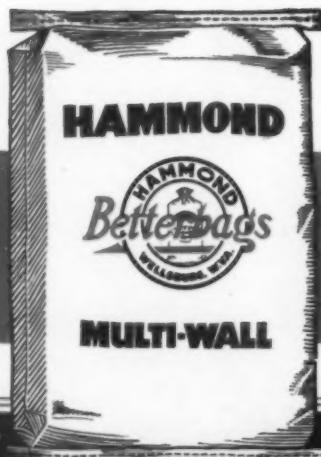
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Symons Cones are built in two types, the Standard for ordinary reduction crushing and the Short Head for extremely fine crushing. There is a size that will suit your operations. Write for further particulars on this outstanding reduction crusher.

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MULTI-WALL PAPER BAGS



If you are critical about cement bags—you'll appreciate the fine qualities of Hammond Multi-Wall Bags. They're easy to fill, handle well, and most important of all, they're tough and are built to take a beating. They'll carry the load dependably from your Pack House to the job.

HAMMOND MULTI-WALL BAGS are carefully engineered to meet your most exacting requirements.

SEWN and PASTED BAGS for
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Capacities: 1 to 60 tons per hour

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To Increase Capacities or Fineness of Present Grinding Plant—
To Reduce Power and Maintenance Costs—
To Insure an Absolutely Uniform Product—

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work accordingly. Where such a margin is not specified, the operator has a chance to profit by close control. It is recommended that during the early stages at least a 15 percent margin be used. However, as control gets more accurate and strength data build up, the precision operator should be able to bring his design curve much closer to his strength curve than 15 percent. Every notch the design curve is raised means a decrease in cement used, with corresponding economy.

Concrete manufacture is basically very similar to the manufacture of open hearth steel. In both cases certain known ingredients are placed in a mixer and the characteristics of the resultant material depend upon the accuracy with which the ingredients were proportioned and the degree of precision used in controlling manufacturing operations. With our present knowledge of concrete proportioning, the precision with which cements are made, and the use of modern equipment, there is no apparent reason why concrete strengths and other qualities cannot be forecast and attained with accuracy comparable with the manufacture of steel. And modern well equipped plants operated under close and intelligent control are turning out just such a product.

Preliminary studies and considerations necessary to secure maximum economy in the concrete mix will be discussed in the next article of this series.

Sand-Lime Brick

Four active sand-lime block and brick plants reported for April and four for March, statistics for which were published in April, 1945.

AVERAGE PRICE FOR APRIL

	Plant Price	Delivered Price
Detroit .....	.....	\$19.75
Saginaw, Mich.	\$15.00	.....
Grand Rapids, Mich. ....	.....	16.20
Seattle, Wash.	19.50	21.50

STATISTICS FOR APRIL AND MARCH

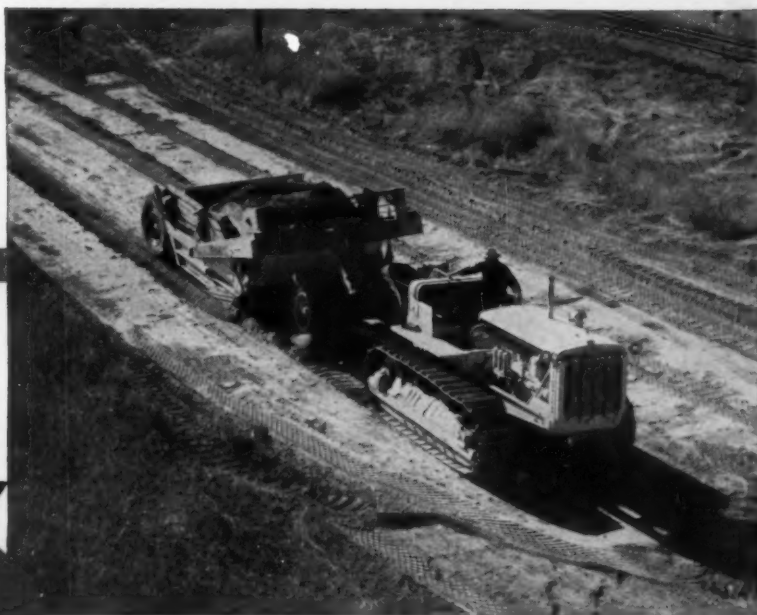
	*March	**April
Production	902,900	886,406
Shipments (rail)	185,000	204,000
Shipments (truck) ...	596,288	531,406
Stocks on Hand	545,000	1,056,000
Unfilled Orders	600,000	1,370,000

*Four plants reporting: * incomplete, one not reporting stocks on hand and one not reporting unfilled orders.

**Four plants reporting: incomplete, one not reporting stocks on hand and one not reporting unfilled orders.

Buy Lime Concern

THE GOLDEN CYCLE CORPORATION has purchased the lime kiln and quarry at Manitou Springs, Colo., operated by Thomas & Brown Co., Pueblo. The lime is being used by the Golden Cycle concern in its mill, and the product also will be sold to the sugar and other industries. William Jones will be continued in charge of the lime plant.



If you've had difficulty obtaining delivery of certain LaPlant-Choate models, please remember that dozers and scrapers continue to rate top priority as essential weapons of war. Moreover, again this year, LaPlant-Choate is producing more dozers for the armed forces than any other company in the industry.

THIS MARK ON EQUIPMENT

means Lowest Possible Cost on the Job

Ask any of the thousands of satisfied owners who have used LaPlant-Choate equipment for years—and they'll tell you that you can't beat a LaPlant-Choate rig for saving time and money on the job. This LaPlant-Choate record of performance and economy—proved on tens of thousands of jobs the world over—will be even more evident in the new improved LPC earthmovers now being engineered for thrifty mass production after Victory. So before you buy any new earthmoving or land clearing equipment, be sure to look for the new LPC trademark. Backed by 34 years of specialized engineering and manufacturing "know-how", this new mark is your assurance of lowest possible cost per yard . . . per ton . . . per acre. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.



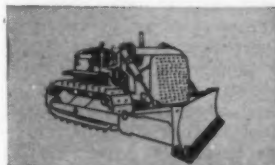
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EARTHMOVING AND LAND



CHOATE

CLEARING EQUIPMENT



ALL TYPES OF DOZERS —
Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.



LARGE OR SMALL SCRAPERS —
Hydraulic or cable operated, front or rear dump, for use with your wheel or track-type tractors.



CABLE OPERATED RIPPERS —
For ripping up hard ground, shale or concrete to facilitate loading with LPC "Carrimar" Scrapers.



LAND CLEARING TOOLS — A
complete line of Brush Cutters, Treeadozers, Rootcutters and Brush Rakes—all are interchangeable.

Three reasons
WHY TDA
 is used in making the
 majority of
HIGH EARLY STRENGTH CEMENTS

1. TDA is a powerful grinding aid.
2. TDA assures the manufacture of a uniform product.
3. TDA improves the desirable properties of the resulting concrete, particularly in strength, plasticity and durability.

TDA is not an air-entraining agent and does not lower the density of concrete. It is the only addition to High Early Strength Cement permitted by ASTM.



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**MANGANESE STEEL
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for
**SHOVELS
 DREDGES
 CRANES
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The Frog, Switch & Mfg. Co.
 Established 1881 CARLISLE, PA.

New Lime Markets

(Continued from page 82)

sure hydrated dolomitic lime from 149,500 to 183,000 sq. cm. per gram. Some 87 percent of this 33,600 increase was due to milling alone. This increase in surface area caused a marked change in the product.

If lime particles are assumed to be plate-like in shape, those examined were from 0.26 to 0.7 microns in diameter and 0.03 to 0.09 in thickness. (A micron is 1/25,400 of an inch.)

Sedimentation (settling) tests of lime were continued, but this report was concerned only with methods of tests.

Mortar Tests

DR. G. J. FINK, in charge of the Association research on mortars at the National Bureau of Standards, submitted a progress report covering tests of workability, consistency, volume change, sieve analyses of limes, and in particular tests of highly hydrated dolomitic limes. Progress has been made in comparing the workability or plasticity of various mortars—always a difficult quality to rate mathematically—by use of the Voss extrusion energy instrument.

Dr. Fink also served as a representative of the National Lime Association at various gatherings about the country of chemists and chemical engineers.

The greater part of his report had to do with methods of tests of mortars.

Possible Organization Changes

Most of the final session of directors' meeting was confined to association finances, the announcement of safety certificate winners, and an informal discussion of possible changes in the organizational setup of the Association. This discussion was started by President Stauffer, who suggested that the various research and promotional activities could perhaps best be handled by divisions within the National Lime Association. He said the geographical district association had not been generally adopted. His suggestion was for divisions based on the five functional fields for lime: (1) construction, (2) chemical, (3) agricultural, (4) finishing lime, (5) masonry lime.

Such a divisional organization would make it possible to set up separate budgets and programs for each division. Mr. Stauffer said this would make it possible to set up a Canadian division, to be run pretty largely by themselves. [This did not seem consistent with his previous remarks about geographical divisions, but the fact is that Canadian producers are primarily interested in chemical or industrial lime, and not in construction lime—the editor.]

The result of the discussion was the appointment of a committee to

(Continued on page 110)

JACK OF ALL JOBS-

**in heavy materials
handling**



Osgood "20" driving piles for a landing pier in North Africa.



Helping to clear the way to Berlin and Victory, "Fighting Osgoods" serve under fire with Army Engineers in Europe, as well as on other battle fronts.



Above—Vital supplies and equipment being unloaded by a "Fighting Osgood Mobilcrane" in the South Pacific.

"FIGHTING OSGOODS" LIFT, DIG AND DRIVE IN THE BATTLE OF SUPPLY

When the engineer troops and SeaBees "go in" on the heels of our attacking forces, they need the right equipment to do a multitude of jobs quickly and efficiently. Roads and air fields must be leveled, loading docks built, supplies loaded and unloaded, rubble cleared away fast.

Osgood shovels and cranes figure dependably in all these operations . . . working as crane, pile driver and shovel. They're engineered with the power, stamina and versatility to keep precision planning and production on schedule. You'll appreciate these advantages when *your* planning goes into action after Victory.

WHEN IT'S WAR BONDS, BUY MORE THAN BEFORE!

THE
GENERAL
EXCAVATOR COMPANY
**CRANES, DRAGLINES
AND SHOVELS**
DIESEL, GAS, ELECTRIC

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WILFLEY TABLES

for Closer Separation in

PHOSPHATE WASHING



MILLIONS of tons of phosphorus are being produced for American agriculture and for war uses. As in the processing of many other ores where a high grade concentrate is derived from a low grade feed, Wilfley Tables handle high tonnages . . . do the job efficiently and at low cost. The photograph above shows six of the twelve No. 6 Wilfley Tables in a modern Florida phosphate plant.

Inquiries on the use of Wilfley Tables for washing phosphorus will be answered promptly.

Marcy Ball, Rod & Tube Mills; Massco-McCarthy Hot Millers; Rock Bit Grinders; Pinch Valves; Belt Feeders; LABORATORY EQUIPMENT.

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CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants.

Engineering Service

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receive suggestions and report back to the directors possible changes in the present scheme of organization. Also, the point was raised that better provision should be made for technical men at industry conventions, when these are again possible. Through a program at a special technical session or otherwise, provision should be made for a free exchange of technical (operating) information. This suggestion seemed to meet with unanimous approval, although most of those present were primarily sales executives.

The committee appointed by Chairman-of-the-Board Hammond consists of the following: Reed C. Bye, Warner Co., Philadelphia, Penn.; C. C. Loomis, New England Lime Co., Adams, Mass.; Amos B. Miner, National Gypsum Co., Buffalo, N. Y.; Russell Rarey, Marble Cliff Quarries Co., Columbus, Ohio; Wilfred W. Sprague, National Mortar & Supply Co., Pittsburgh, Penn.; K. L. Hammond, Keystone Lime Works, Inc., Keystone, Ala., chairman, ex-officio, with S. Walter Stauffer, president of the National Lime Association, also an ex-officio member.

Northwest Diatomites

DIATOMITE or diatomaceous earth, which has become increasingly important as a filter aid and for use as a filler in the manufacture of rubber, paints, and plastics, is the subject of an interesting and informative bulletin entitled, "Diatomites of the Pacific Northwest as Filter-Aids," issued by the Bureau of Mines, U. S. Department of the Interior, Washington, D. C. The authors of Bulletin 460 are Kenneth G. Skinner, Arthur A. Dammann, Roy E. Swift, Geo. B. Eyerly, and Gordon R. Shuck, Jr. This bulletin is a very complete study of Pacific Northwest deposits, and it also outlines the physical and chemical properties, its uses, preparation and test methods, and describes the various deposits in Washington, Oregon, California, and Idaho.

From Sand to Brick

HIGHLAND PARK SAND CO., INC., Richmond, Va., plans to erect a \$100,000 brick and ceramic plant on the present sand producing site. Overburden on this 125-acre tract, averaging about 7-ft. in thickness, has been wasted heretofore, but since analysis shows a high grade yellow clay, excellent for brick manufacture, this waste material will be utilized. Under the 21ft. layer of sand, a 30-ft. strata of clay has been discovered which also will be reclaimed for the manufacture of brick and ceramics.

City to Buy Quarry

CITY MANAGER BREWER BILLIE of Astoria, Ore., has been instructed by the City Commission to get prices on quarry equipment for city operation. If equipment can be obtained, the city will set up its own quarry and crushing plant.

**MORE
HOLE-PRODUCTION
PER MAN HOUR**

Thor

**SINKER
ROCK DRILLS**

4-POSITION THROTTLE

gives operator complete control of drilling speed for all operating conditions.

RIFLE BAR ASSEMBLY

Time-tested, ratchet construction that assures dependable rotation.

POSITIVE AIR SCREEN

Prevents clogging of machine. Takes apart quickly for cleaning. Free flow of air.

ENCLOSED RETAINER SPRINGS

Fully enclosed, dirt-proof operating parts. Tamper proof, permanently set spring tension.

For full details, write for THOR Air Tools Catalog 42A



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Pneumatic
TOOLS**

Branches in Principal Cities



THOR Sinker Rock Drills have exclusive features—plenty of them . . . But none so important as their capacity to drill more rock in less time—at *lower cost* . . . No wonder they are so popular where drilling operations are checked and double-checked in terms of production figures . . . THOR Sinker Rock Drills, for wet or dry operations, range from light machines to heavy duty models for rough, tough work in difficult formations . . . One thing you can be sure of—THOR Sinker Rock Drills will step up output by any time "yardstick"—day, week or month . . . Their smooth operation and rugged construction assure long, lasting, trouble-free service at minimum maintenance cost.



MEASURED AIR MEANS THIS . . .

● **BALANCED POWER** . . . because only a precisely measured quantity of air is admitted behind the piston.

● **AIR ECONOMY** . . . because every ounce of air which enters the machine provides its full measure of power for efficient performance.

● **SMOOTH PERFORMANCE** . . . because every stroke is powered by the same measured quantity of air.

● **LOW MAINTENANCE COST** . . . because there are no separate parts of the patented THOR Valve to get lost or wear out.

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New York

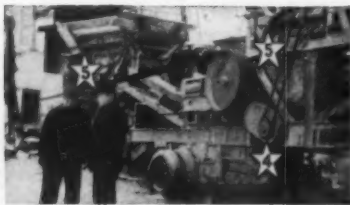
Los Angeles

SINKERS • DRIFTERS • STOPERS • SAWS • SUMP PUMPS • HITCH CUTTERS

★ Places where HARD-FACING Saves Money!



1. Shovel Teeth
5. Crusher Jaws and Cheek Plates



3. Rock Drill Bits
4. Sprocket Teeth
6. Tractor Treads and Rollers

SEE THOSE SHOVEL TEETH, sheaves, rock drill bits, sprocket teeth, crusher jaws, tractor treads and rollers? All are typical equipment parts that can be made extra-resistant to wear by Coast Metals Hard-Facing.

All that is necessary is to weld the Coast Metals overlay or coating to the steel or iron surface to be protected. Use either the electric arc or the gas torch process. Application is easy, and conforms to simple welding techniques. You can weld Coast Metals alloys to all ferrous metals, including manganese steel, alloy steel, cast iron and chilled iron. Coast Metals Hard-Facing eliminates the need

for frequent repairs or replacements also of pump shell liners, hammers, plows, shafts, bulldozers, extruding screws, pump runners, cement pump screws, paddle washers, rolls, dredge pump or other parts. Our new pamphlet, "How to Make Your Equipment Last Longer" goes into full detail. Write for your free copy today.

COAST METALS, INC.

Plant and General Offices:
1232 Camden Ave., S.W., Canton 6, Ohio

Executive Offices:
2 West 45th Street, New York 19, N. Y.

COAST METALS

hard-facing
weld rods

MAKE YOUR EQUIPMENT LAST LONGER

BROWNHOIST BUCKETS

The greedy jaws of Brownhoist clamshell buckets speed up material handling in dirt, clay, coal, gravel and ore. Their deep, clean bites practically eliminate hand shoveling. Extra sturdy. Large sheaves reduce rope wear to a minimum.

AVAILABLE IN ROPE-REEVE, POWER-WHEEL AND LINK-TYPE. For facts and prices write to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York City, Philadelphia, Pittsburgh, Cleveland and Chicago.

New Virginia Specifications

SCARCITY of concrete sand and a high freight rate on delivery from neighboring States has prompted the Virginia Highway Department to accept sand manufactured from dolomite and limestone, for use in construction of concrete highways.

New specifications include a special gradation for this sand, different from the gradation of the natural sand. A comparison of the sieve analysis specifications for the two sands follows:

	Manufactured Sand Percent Passing	Natural Sand Percent Passing
Sieve No. 4	100	100
No. 8	90-100	80-95
No. 16	60-85	70-85
No. 30	30-50	30-50
No. 50	10-30	5-25
No. 100	5-15	0-10
No. 200	0-5	0-5

It will be noticed that there is more leniency shown in the critical 16-mesh size for the manufactured sand. This specification originally was the same as that for natural sand, but due to the extreme difficulty encountered by producers in meeting this specification, the requirement was broadened.

Control of workability is contained in the specification by the provision that the void content must not exceed 50 percent.

Inclusion of manufactured sand in the State specifications will, in all probability, encourage stone producers to manufacture this product. The principal difficulty is crushing to rounded particles, which one producer has already overcome by use of a rod mill. Sharp, elongated particles are not desirable since they increase the void content and do not form a bond as readily as do the rounded particles. The broad specifications, however, should enable many stone producers to add a new product to their market.

Colorado Fluorspar Sold

COLORADO FLUORSPAR CORPORATION has sold its mine and mill property in Brown's Canon near Salida, Colo., to a California mining group incorporated under the name of Colorado Fluorspar Mines, Inc. Capacity of the mill will be doubled with the addition of a new unit which includes another ball mill, additional flotation cells and a new classifier. Mine operations will be augmented with a new three-compartment shaft and new hoisting equipment. The mill will have a capacity of more than 100 tons daily when the new equipment is installed. Acid grade spar will be produced. H. D. Tudor, San Francisco, Calif., is president of the new company, and Jos. W. Cook is vice-president. S. F. Wickham will be general superintendent at the plant, and Roy Hickman will be assistant superintendent.



But there's nothing rare about the applications for Taylor Spiral!

THERE isn't much need for anxiety about engineers leaning too far to the light side in designing piping. Naturally, where conditions require, wall thickness is cautiously calculated and topped off with a generous factor of safety.

However, there *is* some justification for concern over the practice of using heavier pipe than needed. Too often the pipe designer breathes a sigh of relief when he comes to those low or moderate pressure jobs, quits figuring, and simply falls back on his old standby, Standard Thickness pipe!

Of course this is done on the theory that Standard Thickness represents the low point on the scale of available pipe thicknesses and is therefore a safe "out". It's safe enough, but it just happens that there is another kind of pipe, amply safe but much lighter than Standard Thickness, which can satisfy a large percentage of those everyday pipe requirements.

Yes, if you will look at the record you will find that light-but-strong Taylor Spiral Pipe can handle a big percentage of the run-of-plant services—applications like those listed below—and handle them with strength and service life to spare. Naturally this means dollars saved—dollars saved in first cost, in transportation cost, in handling cost, in erection cost, in the cost of supporting structures. In fact, the installed cost of Taylor Spiral Pipe in many cases is scarcely half that of the heavy pipe it so well replaces.

Switching to Taylor Spiral Pipe for services like those listed is made easy by the complete range of sizes and wide variety of fittings. Thicknesses range from 12 to 6 gauge; sizes from 6" to 42"; joint lengths up to 40 ft. All types of end joints and couplings, all kinds of fittings and specials or fabricated assemblies are produced by Taylor Forge & Pipe Works, assuring complete service and undivided responsibility.

TAYLOR FORGE & PIPE WORKS

General Offices & Works: Chicago, P. O. Box 485 ★ New York Office: 50 Church St. ★ Philadelphia Office: Broad Street Station Bldg.

**TAYLOR
SPIRAL PIPE**

CHANGE TO TAYLOR SPIRAL PIPE FOR:

- High and Low Pressure Water Lines
- Low Pressure Steam and Air Lines
- Steam and Diesel Exhaust Lines
- Vacuum and Suction Lines
- Blower Piping
- Sand and Gravel Lines
- Industrial Gas Lines
- Oil and Gas Gathering Lines
- Swing Pipe
- Spray Pond Piping
- Hydraulic Mining
- Dredge Lines

Big Savings



The above picture of a small Sauerman Scraper digging gravel from pit and delivering to crushing plant shows the simple effectiveness of this method. This Sauerman machine uses 5 gals. of gasoline to move 43 cu. yd. of material per hour.

SEND FOR THIS CATALOG

The Sauerman Catalog pictures and describes many typical projects where materials are being dug, hauled and placed at rock bottom cost. A copy of this useful book is yours for the asking.

SAUERMAN BROS., INC.

530 S. Clinton St., Chicago 7, Illinois

Dig, Haul and Dump— for a few cents a yard

Where materials are to be moved distances of several hundred feet or more, a SAUERMAN Drag Scraper or Cableway can cut the cost to a low figure because it is able to dig, haul and place the material in a continuous automatic movement, without aid of other machinery. The operation is smooth and rapid, producing large yardage with moderate expenditure of power.

The first cost of a SAUERMAN Machine is reasonable, maintenance amounts to very little, and the simplicity of operation makes it possible to place the control of even the largest installation in the hands of one operator. Moreover, the machine is very flexible, hence easily adapted to changing conditions.

The Right Combination

"Pulsating Magnet" **ELECTRIC VIBRATORS**

on those troublesome, "Constipated" bins and hoppers to keep their contents agitated and free-flowing.

"Vibra-Flow" **VIBRATORY FEEDERS**

under those bins and hoppers to regulate their discharge by rheostat control of rate of flow.

by **SYNTRON**
REG. TRADE MARK

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SYNTRON COMPANY

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Homer City, Pa.

OBITUARIES

WALLACE L. CALDWELL, president of the Alabama Asphaltic Limestone Co., Birmingham, Ala., passed away April 2, as a result of injuries received when his automobile rolled against him after he had parked it at his home. He was 56 years old. Mr. Caldwell went to Birmingham in 1912 as manager for the Pittsburgh Testing Laboratory. From 1921 to 1925 he served as president of the Kentucky Rock Asphalt Co., Louisville, Ky., and from 1925 to 1928 as vice-president of the Peoples Light & Power Co., New York. He returned to Birmingham in 1928 to organize the Alabama Asphaltic Limestone Company. At the time of his death, Mr. Caldwell also was president of the Southern Vacuum Concrete, Inc., president of the Aerocrete Western Corp. of Chicago, and vice-chairman of the Southern Research Institute.

CARL LOTZ, owner of the Carl Lotz Sand and Gravel Co., Wausau, Wis., passed away April 15 following an illness of about a year. He was 80 years of age. Mr. Lotz was a resident of Wausau for 60 years and a pioneer in the street and highway paving field, both locally and in the State.

1ST LT. MARTIN M. HAMMERSCHMIDT, son of Martin Hammerschmidt, secretary-treasurer of the Elmhurst-Chicago Stone Co., Elmhurst, Ill., died on March 1 of wounds received while fighting in Germany. Lt. Hammerschmidt had been awarded the Silver Star for gallantry in action in January.

GUILFORD DUNCAN, president of The Ludlow-Saylor Wire Co., St. Louis, Mo., died May 9 at the age of 67. Mr. Duncan, a graduate of Yale University, joined the company in 1900. He became head of the firm in 1911, succeeding his father, the late William Duncan, pioneer railroad man.

JOHN E. KELLY, superintendent at the McCoy plant of Warner Co., Philadelphia, Penn., died recently. In 1910 Mr. Kelly joined the Merion Lime and Stone Co. at Bridgeport, where he saw the plant grow from 4 to 7 kilns, with the addition of a hydrate plant whose capacity is 100 tons of quicklime a day. When Warner bought this company in 1928 Mr. Kelly continued as superintendent.

J. EVERETT GADDIS, secretary and superintendent of the Union Quarries Co., Van Wert, Ohio, died April 5 at the age of 53. Mr. Gaddis was widely known in business activities of Van Wert for many years.

STILES S. WELLS, founder and president of the Bay Cities Asbestos Co., Oakland, Calif., died recently at the age of 52.

It pays to be a Bemis Multiwall paper bag Customer

EVEN though direct government purchases have taken a considerable part of our multiwall paper bag production this year, Bemis customers have not suffered . . . they have been supplied on the basis of past purchases, even in the face of the labor shortage and no increase in facilities.

Naturally, the demand for Multiwalls has been greater than the supply. Much as we regret inability to fill all orders, we have felt a responsibility to take care of our regular customers first. Fortunately, we've been able to do that—and right on schedule. If it's humanly possible, we'll keep on maintaining this service.

War or peace, we want our customers to feel that it pays to be Bemis customers.



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Baltimore • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Denver
Detroit • Houston • Indianapolis • Kansas City • Los Angeles • Louisville
Memphis • Minneapolis • New Orleans • New York City • Norfolk • Okla-
homa City • Omaha • St. Louis • Salina • Salt Lake City • Seattle • Wichita



A major reason we've been able to supply our Multiwall customers is the size and flexibility of our production facilities.

Bemis Multiwall Plants at

PEORIA, ILL.
EAST PEPPERELL, MASS.
MOBILE, ALA.
SAN FRANCISCO, CALIF.
WILMINGTON, CALIF.
ST. HELENS, ORE.

These plants not only give us large production, but also quick accessibility to all parts of the country.



East Pepperell, Mass.

GUARD AGAINST *Breathing* ROCK DUSTS WITH THESE APPROVED DUST RESPIRATORS



M-S-A *Comfo* RESPIRATOR

APPROVED U. S. BUREAU OF MINES

Approved protection against all dusts. Large twin filters provide low breathing resistance. Simple and rugged design. Flexible facepiece fits all faces without adjustment.



M-S-A *Dustfoe* RESPIRATOR

Approved U. S. Bureau of Mines

One of the most compact and lightweight approved dust respirators. No interference with vision or the wearing of goggles. All parts easily removed for cleaning or replacement.

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STREETS
PITTSBURGH 8, PA.

FINANCIAL

RECENT DIVIDENDS

Bessemer Limestone & Cement Co. pfd.....	\$.75	July 2
National Gypsum Co. pfd 1.12½		June 1
Southern Phosphate Corp.	.10	June 30
U. S. Gypsum Co.....	.50	July 2
U. S. Gypsum Co. pfd...	1.75	July 2

SCHUMACHER WALL BOARD CORPORATION, Los Angeles, Calif., has reported a net income of \$479,473 for the three months ended March 31, 1945, which compares with \$471,264 for the three months ended March 31, 1944.

LEHIGH PORTLAND CEMENT CO., Allentown, Penn., had a net profit of \$448,012 for the twelve months ended March 31, 1945. This compares with \$1,160,879 for the year ended March 31, 1944. The company called for redemption on June 1, all outstanding 4 percent convertible preferred stock at \$110 a share and accrued dividends.

NATIONAL GYPSUM CO., Buffalo, N. Y., reports a net profit of \$281,492 for the quarter ended March 31, 1945, as against \$233,918 for a like period ended March 31, 1944.

SUPERIOR PORTLAND CEMENT, INC., Seattle, Wash., had a net income of \$394,757 for the year ended December 31, 1944, which compares with \$444,714 for the year ended December 31, 1943.

BOSTON SAND & GRAVEL CO., Boston, Mass., showed a net loss of \$181, after all charges, for the year ended December 31, 1944. This compares with a net profit of \$39,538 for the year ended December 31, 1943.

UNITED STATES GYPSUM CO., Chicago, Ill., showed the following consolidated income account for the years ended December 31:

	1944	1943
Net sales	Not stated	*\$59,266,127
Cost of sales.....		*39,649,544
Selling, etc., expense		*7,421,452
Oper. profit	\$ 9,702,999	12,195,130
Other income.....	481,174	444,346
Total income	10,184,173	12,639,476
Deprec. & deplet.	2,290,558	2,320,922
Income taxes	2,415,000	2,503,000
Exc. prof. tax, net	1,141,000	2,613,000
Legal, etc., exp...	110,427	164,106
Net income	4,227,187	5,038,450
Preferred divs. ...	547,554	547,554
Common divs. ...	2,304,280	2,393,544
Surplus for year...	1,285,353	2,097,352
Earn. surp. . . 1-1	32,469,105	30,371,753
Earn. surp., 12-31	33,754,458	32,469,105
Times pfd. divs...	7.72	9.20
Earn. pfd. shs....	\$54.04	\$64.41
No. of pfd. shs...	78,222	78,222

*From SEC report.

Renegotiation proceedings for 1943 resulted in a net payment to the government of \$7473 which was so small as to be charged to expense. The cash position of the company continues strong with nearly \$30,000,000 in cash and government securities reported.

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of the
CATALOG

KNOX

Valves-Couplers-Nipples-Clamps-Menders



KNOX MANUFACTURING CO.

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SINCE 1911 PRODUCERS OF

KNOX

Valves-Couplers-Nipples-Clamps-Menders

INDUSTRIAL SILICA CORPORATION, Youngstown, Ohio, presented the following income account for the years ended December 31:

	1944	1943
Gross profit	\$733,210	\$807,917
Selling, etc., expense ..	162,897	175,789
Depreciation & depletion	78,616	75,195
Operating profit	491,897	556,933
Other income	8,151	7,281
Total income	500,048	564,214
Other deductions	45,863	30,331
Fed. income tax	67,000	68,000
Excess prof. tax	240,000	287,500
Post-war tax cred.	cr 24,000	cr 28,750
Net income	171,185	207,133
Preferred divs.	97,500	121,875
Surplus for year	73,685	85,258
Earn. surplus, 1-1	455,667	383,213
Bldgs., equip. loss	4,817	.....
①Silica dep. loss .....	.....	12,804
Earn. surpl., 12-31	524,535	455,667
Earn., pfd. share	\$11.41	\$13.81
②Earn., com. sh.	0.69	1.02
No. of pfd. shares	15,000	15,000
No. of com. shares	107,215	107,215

①Loss on sale or exhaustion of silica deposits, less portions applicable to capital surplus.

②Disregarding preferred arrears.

PETOSKEY PORTLAND CEMENT CO., Petoskey, Mich., had a net loss of \$33,004, after charges and interest, for the year ended December 31, 1944. Net sales in 1944 were \$1,190,989 as against \$1,143,054 in 1943.

PENNSYLVANIA-DIXIE CEMENT CORPORATION, New York, N. Y., reported a net loss of \$714,343 for the year ended March 31, 1945, which compares with a profit of \$262,374 for the year March 31, 1944. Net sales for the year ended March 31, 1945, were \$4,502,067 as against \$6,962,493 for a like period ended March 31, 1944.

LAWRENCE PORTLAND CEMENT CO., New York, N. Y., reported a net loss of \$290,131 for the year ended December 31, 1944, as against \$152,241 for the year ended December 31, 1943. Net sales in 1944 were \$1,752,722 as compared with \$2,930,518 in 1943.

ALPHA PORTLAND CEMENT CO., Easton, Penn., reported the following income account for the years ended December 31:

	1944	1943
Net sales	\$4,916,281	\$6,400,122
Oper. Expenses	4,097,275	4,629,167
Maint. & repairs	548,389	760,796
Deprec. & deplet.	514,716	800,687
Operating profit	d 244,099	209,471
Other income	173,994	93,278
Total income	d 70,105	302,749
Income charges	1,209	64,519
Fed. income tax .....	.....	100,000
Net income	d 71,314	138,230
Common divs.	591,356	591,356
Deficit for year	662,670	453,126
Surplus, Jan. 1	2,906,264	*3,523,740
Pr. yrs. depr. adj. ....	.....	cr 513,763
Debits .....	.....	1678,114
Inc. tax refund	cr 60,000	.....
Surplus, Dec. 31	2,303,594	2,908,264

* Includes capital surplus.

† Additional Federal income and profits taxes for prior years, less related claims for refund, \$183,059; transfer to capital surplus of credit arising from retirement of capital stock in prior years, \$495,055; total, \$678,114.

‡ Claim for refund of Federal income taxes based on carry-back of estimated net loss from 1944.



PISTON-TYPE CONTROL VALVE

CENTER-LIFT HOIST

REVERSIBLE TAILGATE HARDWARE

EASY-REACH TAILGATE LEVER

HOIST MOUNTS ABOVE FRAME

ACCESSIBLE HOIST CYLINDER

PATENTED TIRE AND TOOL PACK

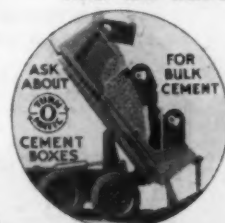
DASH CONTROLS FOR HOIST AND TAKE-OFF

Only from Hercules do you get all these advantages for easy, low-cost, efficient operation and maintenance. For example—consider the fingertip controls which operate Hercules hoists and power take-offs. Pull out two buttons . . . up goes the body and the load is dumped. Push the same two buttons . . . the body slips down into road position. Simple, isn't it? And it's only one of a host of reasons why you'll want Hercules dump bodies for your postwar trucks.

Until you can get the new Hercules dump body you want, let your Hercules distributor keep your present equipment in running order. He will furnish the service you need.



Ask About Turn-O-Matic Cement Boxes for Bulk Cement—Now Available—Write Today!

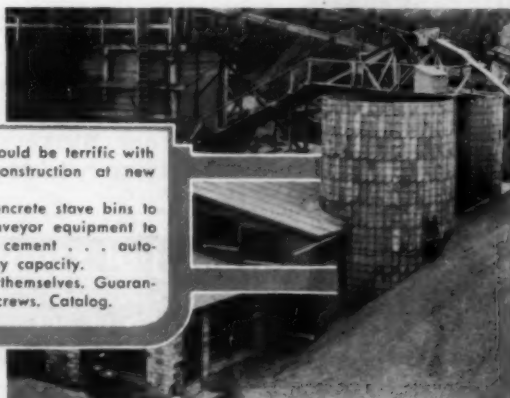


HERCULES STEEL PRODUCTS COMPANY GALION, OHIO

GET READY FOR BUSINESS

The next five years should be terrific with road and building construction at new peaks. Install N & F super-concrete stave bins to store and suitable conveyor equipment to handle sand, gravel, cement . . . automatically and fast. Any capacity. Inexpensive—pay for themselves. Guaranteed. Expert erection crews. Catalog.

NEFF & FRY CO.
CAMDEN, OHIO



AMERICAN CRUSHERS

LEADERS IN PERFORMANCE



AMERICAN CRUSHERS are used in so many plants because they operate at lower power cost, improve the output, and stay on the job without breakdowns. The best, toughest materials available are built into them—manganese steel wearing parts, alloy steel shaft, heavy duty anti-friction bearings enclosed in dust-tight pillow blocks, and 2-in. thick cast steel discs. Write us for detailed information.

AMERICAN PULVERIZER COMPANY

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NOT ONE FAILURE in a Million!



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EVANSTEEL
Bulletin

... that's a pretty good record but it is the one established by our chrome-nickel alloy ROPE SOCKETS.

★

Yes, we have been making them for 36 years without a single recorded failure.

★

Take a lesson from experience, and specify ... EVANSTEEL Rope Sockets. They are stronger, lighter, and cost less.

CHICAGO STEEL FOUNDRY COMPANY

PYRASTEEL
for high temperatures

KEDZIE AVE. & 37TH ST.

CHICAGO 32, ILL.

Makers of Alloy Steel for 30 Years

EVANSTEEL
for strength

SOUTHERN PHOSPHATE CORPORATION, Baltimore, Md., had a net income of \$161,278, after charges and interest, for the year ended December 31, 1944. This compares with \$106,409 in 1943.

PENNSYLVANIA-DIXIE CEMENT CORPORATION, New York, N. Y., has reported a net loss of \$714,343 for the year ended March 31, 1945, which compares with a net profit of \$262,374 for the year ended March 31, 1944. Net sales for the year ended March 31, 1945, were \$4,502,067 as against \$6,692,493 for the year ended March 31, 1944. The management has been considering refinancing plans, according to Victor N. Roadstrum, chairman.

RIVERSIDE CEMENT CO., Los Angeles, Calif., showed a net income of \$140,622 for the twelve months ended December 31, 1944, after charges and taxes, which compares with \$269,814 for year ended December 31, 1943. Garner A. Beckett, president, announced that \$200,000 was applied during 1944 in the reduction of bank loans. Capital expenditures of \$360,000 were made in 1944, largely at the Oro Grande plant, and additional expenditures are contemplated in 1945 as equipment becomes available.

MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, showed a net loss for the year ended December 31, 1944, of \$295,407 compared with a net profit of \$59,224 in 1943. By excluding \$529,432 charged to idle plant expenses, 1944 operating profit would be \$45,109. Only capital obligations of the company remaining, after paying off the final note of \$220,000, are \$330,600 of 6 percent preferred and 177,934 shares of common stock.

CALAVERAS CEMENT CO., San Francisco, Calif., reports the following income account for the years ended December 31:

	1944	1943
Net sales	\$1,494,647	\$1,807,420
Cost of sales	1,222,135	1,195,621
Selling, etc., expense	253,292	245,152
Operating profit	19,220	366,647
Other income	3,311	3,548
Total income	22,531	370,195
Loss, assets sold		6,389
Interest paid	328	
Fed. income tax	10,251	96,268
Excess prof. tax		109,340
Post-war and debt retire. credit		cr 10,934
Net income	11,951	169,132
Preferred divs.	25,637	51,273
Surplus for year	d 13,686	117,859
Earn. surplus, 1-1	815,890	687,770
Pr. yrs. inc. tax	7,387	cr 10,261
Inc. tax adjust.	cr 82,120	
Earn. surp. 12-31	876,938	815,890
Earn. pfd. share	\$0.75	\$9.50
Earn., com. sh.	d 0.80	0.40
No. of pfd. shares	16,013	17,091
No. of com. shares	124,437	124,437

After depreciation, depletion and amortization: 1944, \$277,157; 1943, \$239,263.

Disregarding preferred arrears.
Claim for \$91,662 resulting from carry-back provisions, less adjustment of post-war refund of \$9,542.

JOHNSON



ALL-WELDED

BUCKETS

**Have ALL Features That Assure
FAST, LOW-COST
DIGGING**

Hard, on-the-job experience proves the many practical advantages of Johnson Clamshell Buckets—they dig cleaner and faster and last longer. Renewable lip edge-bar of tough manganese steel reduces wear and is readily replaced in the field.

Absence of power-wasting rivets and bolts streamlines digging action. The shell is shaped to fill quickly and easily with a minimum of lifting action. The result is better balance and improved digging quality in all types of material.

Needle-bearing mounted closing sheaves, sealed against dirt and moisture, give free-running cable action at all times.

Cable wear is greatly reduced by guide sheaves which replace ordinary crossrollers. Lower sheaves are protected by extra heavy-steel plates.



General purpose type 1/2 to 2 yard capacity in stock for immediate delivery to contractors with required government authorization.



Johnson Clamshell Bucket showing manganese steel teeth designed for smooth, speedy digging.



Johnson Bucket in open position showing heavy shock-preventing protection plate for lower sheave assembly.

Write today for full information

**THE C. S. JOHNSON
COMPANY**

Champaign, Illinois

A Koehring Subsidiary

Manufacturers' News

Joshua Hendy Iron Works, Sunnyvale, Calif., has appointed C. G. Cox to the executive staff of the company. Mr. Cox will serve as administrative assistant to A. A. Browne, manager of engineering and sales. He will make his headquarters at Sunnyvale, Calif.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces the appointment of Ernest Franks as sales manager in charge of sales of industrial wheel tractors and power units, with headquarters at Milwaukee, Wis. Mr. Franks has been with the company since 1927. Charles F. Codrington has been appointed assistant to the manager and A. E. Caudle has been appointed sales manager of the blower and compressor department.

John A. Roebbling's Sons Co., Trenton, N. J., has announced that Ernest C. Low, general manager of sales, who has been associated with the company since 1910, has been named vice-president in charge of sales; John D. Thompson, works manager, becomes vice-president in charge of production; and Charles M. Jones, manager of engineering, is now vice-president in charge of engineering. Archibald W. Brown, treasurer, has been elected a member of the board of directors. Other officers of the company are: Lt. Joseph M. Roebbling, chairman of the board; Charles Roebbling Tyson, president; Lt. Col. Ferdinand W. Roebbling III, vice-president; and Herbert D. Rathbun, secretary.



E. C. Low

Lime & Hydrate Plants Co., York, Penn., has announced through President and General Manager Wm. J. Kuntz that he has disposed of his interests in McGann Manufacturing Co., Inc., York, Penn. McGann Manufacturing Co., while working as associates with Lime & Hydrate Plants Co., manufactured all of the patented specialties of Lime & Hydrates Co., but, effective March 27, 1945, this agreement was cancelled and from that time forth this equipment will be manufactured in the shops of Lime & Hydrates Co., and those of recently acquired associates. A new plant has been acquired in York at 590 Prospect Street, and the shops of Emerton Manufacturing Co., Bairs Station, Penn., have been acquired for the manufacture of non-ferrous metals as well as gray iron and semi-steel.

The McGann Manufacturing Co., York, Penn., in announcing changes in ownership and management, named the following official personnel: Clyde H. Smith, president; Mrs. Catherine J. Smith, vice-president and assistant treasurer; Geo. Arisman, Sr., vice-president and general manager; and J. E. Schmidt, secretary and controller.

Koehring Co., Milwaukee, Wis., has announced through J. F. Robbins, new sales manager who was recently moved up to vice-president and sales manager of C. S. Johnson Co., that the following Western distributors have been appointed: Western Machinery Co., Spokane, Wash.; Columbia Equipment Co., Portland, Ore., and Boise, Idaho; Moore Equipment Co., Stockton, Calif.; and Harron, Rickard and McCone, Los Angeles, Calif. Other new distributors are Allied Construction Equipment Co., St. Louis, Mo.; Atlantic Tug & Equipment Co., Syracuse, N. Y.; Florida Equipment Co., Jacksonville, Miami and Tampa, Fla.; and Frantz Equipment Co., Philadelphia, Penn. Factory representatives have been assigned to service each construction area. F. S. Ray covers the southern States; L. H.

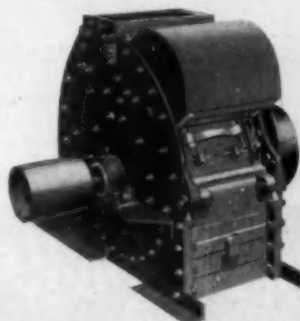
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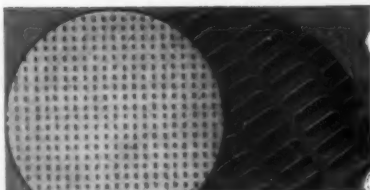
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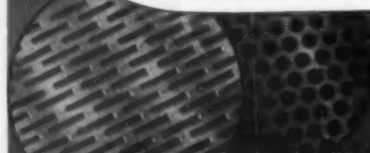


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RACINE - WISCONSIN

Belling the Southwest; J. L. Lamley the Northwest and R. E. Bansemer the Middle West. William J. Reagan, export manager who joined the company last year, has returned from a personal survey tour of Latin America.

United States Rubber Co., New York, N. Y., announces the appointment of Howard W. Kelsey as sales promotion manager of the general products division.

The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., has received the National Security Award by the United States Office of Civilian Defense for the organization and work done by the company in its defense work. The award consists of a certificate and a flag, in addition to the Army-Navy "E" Award, renewed twice, the Treasury "T" flag, and AAF Approved Quality Control Rating already received by the company.

The Timken Roller Bearing Co., Canton, Ohio, announces the retirement of Tracy V. Buckwalter, who for the past 25 years has served as chief engineer and vice-president. Mr. Buckwalter came with the company in 1916 as chief engineer after 16 years with the Pennsylvania Railroad Co. He was elected vice-president in 1925. Many important developments in the railroad field were made under his direction.

Highway Equipment Co., Cedar Rapids, Iowa, has announced the appointment of the following dealers in the sale of its line of agstone spreaders: Highway Spreader Co., owned and operated by R. W. Haferkamp and G. L. Glasbrenner, at Mt. Pulaski, Ill., in the entire territory south of Highway 6 in the State of Illinois, and Elghmy Equipment Co., Rockford, Ill.

Wickwire Spencer Steel Co., Buffalo, N. Y., has announced the appointment of Alvin F. Franz as general superintendent of the Buffalo plant, and the appointment of A. C. Bekert as comptroller of the company and its subsidiaries.

Hammond Bag and Paper Co., Wellsburg, W. Va., has elected M. E. Greiner as vice-president in charge of sales. He will continue to serve as assistant general manager.

Athey Truss Wheel Co., Chicago, Ill., has elected B. F. Lease as president of the company, succeeding the late C. Kier Davis, who was killed in an automobile accident in March. Mr. Lease has been vice-president in charge of sales, advertising and service since July, 1944.

He started with Athey in 1931 as special representative, and from there he advanced rapidly to district representative; manager, service and research; manager, domestic sales; vice-president in charge of sales, advertising and service; and now to president. Prior to joining the Athey organization, he served for many years with the Republic Truck Co. and Lynn Mfg. Co.

Macwhyte Co., Kenosha, Wis., has appointed Fred M. Sime as district sales manager for the Pacific southwest and William J. Brett as district sales manager for the Pacific northwest.

H. K. Porter Co., Inc., Pittsburgh, Penn., has appointed Col. G. deFreest Larner as assistant to the president. This announcement was made by T. M. Evans, president of the company. Colonel Larner will have charge of termination of war contracts, renegotiation, and special tax problems.

Gar Wood Industries, Inc., Detroit, Mich., has appointed Commander John J. Bergen, U.S.N.R. (inactive), as chairman of the executive committee and also chairman of the board of directors. In addition he was named chairman of St. Paul Hydraulic Hoist Co., a subsidiary.



B. F. Lease